VOL. LXXX PART NINE

JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

SEPTEMBER 1955

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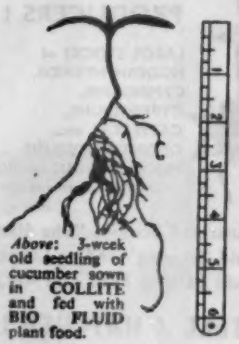

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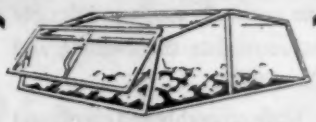

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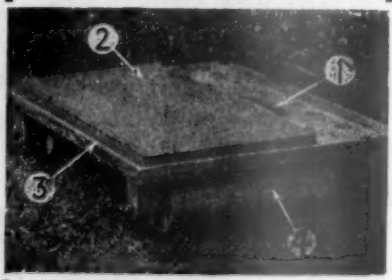

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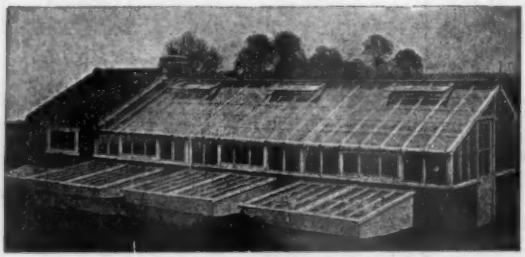

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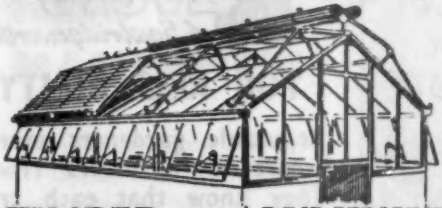

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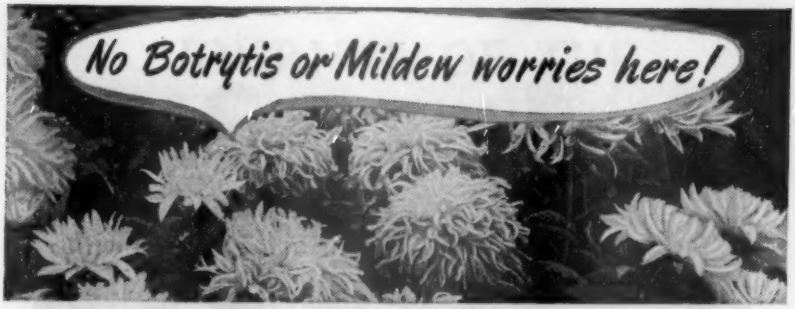

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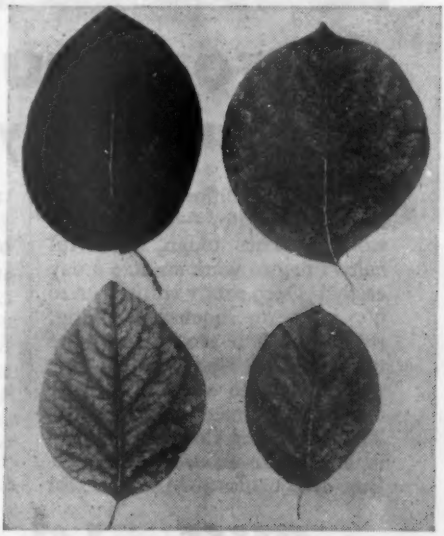

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JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

VOL. LXXX PART NINE

September 1955

THE SECRETARY'S PAGE

ANNOUNCEMENTS—SEPTEMBER AND OCTOBER

Shows

FRIDAY, September 2 1 P.M. to 7.30 P.M. SATURDAY, September 3 10 A.M. to 6 P.M.	National Dahlia Society's Show.
TUESDAY, September 6 12 NOON to 6 P.M. WEDNESDAY, September 7 10 A.M. to 5 P.M.	Fortnightly Show. Cactus and Succulent Plant Show (2nd International Congress of the International Organization for Succulent Plant Study).
FRIDAY, September 9 11 A.M. to 7 P.M.	National Rose Society's Show.
TUESDAY, September 13 1 P.M. to 7.30 P.M. WEDNESDAY, September 14 10 A.M. to 6 P.M.	National Chrysanthemum Society's Show.
TUESDAY, September 20 12 NOON to 6 P.M. WEDNESDAY, September 21 10 A.M. to 5 P.M.	Great Autumn Show.
TUESDAY, October 4 12.30 P.M. to 6 P.M. WEDNESDAY, October 5 10 A.M. to 5 P.M.	Fortnightly Flower Show. Fruit and Vegetable Show.
TUESDAY, October 18 12 NOON to 6 P.M. WEDNESDAY, October 19 10 A.M. to 5 P.M.	Fortnightly Flower Show. Tree and Shrub Competition.

R.A.F. Horticultural Show. The R.A.F. Horticultural Show scheduled for September 27–28 has been cancelled.

Lectures

TUESDAY, September 6, at 3 P.M. "Autumn Bulbs for Garden and Cold-house" by MR. E. B. ANDERSON.

TUESDAY, September 20, at 3 P.M. "Agapanthuses" by THE HON. LEWIS PALMER, F.L.S., V.M.H.

TUESDAY, October 4, at 3 P.M. "Wall Fruit" by MR. F. J. ROSE, V.M.H.

TUESDAY, October 18, at 3 P.M. "The Choice and Care of Trees for Small Gardens" by MR. F. P. KNIGHT, F.L.S.

Demonstrations at Wisley—The following demonstration will be given at Wisley, that on the second day being a repetition of that given on the first.

Vegetable Garden

September 28–29. Digging, Trenching, Manuring and Composting. (Commencing at 2 P.M.)

The Society's Examinations—The Preliminary Examination for the National Diploma in Horticulture will be held on Saturday, December 3, 1955. The closing date for entry is October 1, 1955.

Admission to the Gardens at Wisley—The Council has decided as an experiment to open the Gardens to Fellows on Sundays throughout the winter. The times of opening on Sundays will now be as follows:—

From the second Sunday in March to the last Sunday in September from 2 P.M. to 6 P.M. On other Sundays (excluding Christmas Day) from 2 P.M. until 5 P.M. or sunset, whichever is the earlier.

XIV International Horticultural Congress—This congress is being held at The Hague, Holland from August 29 to September 6, 1955. The previous congress was held in London under the presidency of the late LORD ABERCONWAY, and DR. H. V. TAYLOR, who was then Chairman of the Organizing Committee, is leading a strong delegation from the Society to the present congress. It is hoped that considerable progress will be made at this congress in the complicated question of nomenclature of horticultural plants. MR. F. E. W. HANGER, the Curator of our Gardens, is reading a paper to the congress on Propagation, and several papers are being delivered by other representatives from this country.

Flower Arrangement Exhibition—There will be an exhibition of Floral Arrangements in the New Hall on October 7 and 8. Proceeds will be donated to the Gardeners' Royal Benevolent Institution in aid of the Hospital Annexe at the Institution's Country Home. Schedules and full particulars may be obtained from the organizer: MISS JULIA CLEMENTS, 132 Sloane Street, S.W.1. (SLO 6350). Admission charges are: October 7, 12 NOON to 5 P.M. 3*s.* 6*d.*, 5 P.M. to 7 P.M. 2*s.* 6*d.*; October 8, 10 A.M. to 1 P.M. 2*s.* 6*d.*, 1 P.M. to 5 P.M. 1*s.* 6*d.*

NOTES FROM WISLEY

J. B. Paton

FOR those Fellows who are contemplating ordering plants for the improvement or extension of their gardens the month of September is not too early to make a start. When considering plants to purchase a useful selection may be obtained by consulting the list of the plants which have received the Award of Garden Merit. The Award of Garden Merit was established in 1922 to mark plants of proved and outstanding excellence for garden use. It is given by the Council of The Royal Horticultural Society on the recommendation of the Wisley Advisory Committee usually but not exclusively to plants which have been grown and are well known at Wisley. Notes about the plants which have received this award are published from time to time in the JOURNAL and the earlier notes are collected together and published under the title *Some Good Garden Plants*.

Of trees to receive this award comparatively recently, *Halesia carolina* and *Oxydendrum arboreum* are both only suitable for growing on an acid soil. *Halesia carolina* from south-eastern United States is a quick-growing tree up to 30 feet in height at maturity and when only a tree of quite small stature it has the merit of producing in early May white pendulous bell-shaped flowers. It is closely allied to *H. monticola*, from which it is distinguished by the fact that it makes a smaller, more spreading tree and that it has smaller flowers and fruits. *Oxydendrum arboreum* is much rarer in gardens but should be seen more often because not only does it flower in late July and August but it is also one of the most brilliant trees for autumn colouring. This native of eastern North America makes a rather narrow tree up to 20 feet high and produces ¼-inch-long cylindrical flowers in a lax panicle 6-10 inches long. The large leaves have a pleasant acid taste and so give the tree the popular name of "Sorrel Tree."

Also only suitable for acid soils are the following eight shrubs. *Camellia japonica* 'althaeaflora' and *C.* × *williamsii* 'J. C. Williams' are both excellent plants for either a sheltered wall or a woodland garden. The first received the award in 1953 and was raised in 1819 at Chandler's Vauxhall nursery from seeds of *C. japonica* 'anemoniflora,' while the latter was raised at Caerhays by the late J. C. WILLIAMS and was described by the late LORD ABERCONWAY as "one of the best shrubs that has ever been introduced to our gardens." It is a hybrid between *C. saluenensis* and *C. japonica* and produces an abundance of flowers with pale blush petals and a mass of yellow stamens. These flowers have the merit of falling off the plant when they die rather than hanging on as do the dead flowers of most varieties of *C. japonica*. Of rhododendrons recently given this high honour *R.* 'John Cairns' is one of the evergreen

hybrids known collectively either as 'Kaempferi Hybrids' or 'Malvaticum Hybrids.' It makes a low-growing, spreading, free-flowering plant covered with a mass of red flowers. Of similar habit is the Kurume azalea *R.* 'Hi-No Mayo' with phlox-pink funnel-shaped flowers. Both are eminently suitable for planting in the small lime-free garden. For the larger garden there is *R.* 'Pink Pearl' which is so well known as scarcely to need mention. *Kalmia latifolia*, the Calico Bush, *Pieris floribunda* and *Calluna vulgaris* 'Alportii' have also all received this award since the end of the war.

A tree suitable for the chalky garden is CAPTAIN COLLINGWOOD INGRAM'S very fine hybrid *Prunus* × *incam* 'Okame,' which is a selected clone from the cross *P. campanulata* × *P. incisa*. It produces in March deep pink flowers. Likewise suitable for chalky or acid gardens are the following shrubs. The March-flowering Korean *Forsythia ovata* is seen to the best advantage with an evergreen background which shows up its bright yellow flowers carried in pairs at each node. Also appearing in spring are the lemon-yellow slightly scented blooms of the American *Mahonia pinnata*. This evergreen shrub up to 10 feet high is attractive at all seasons of the year on account of its spiny-toothed, slightly lustrous leaves. Two closely allied daphnes, *D. retusa* and *D. tangutica*, natives of China, are both low-growing, spring-flowering evergreens. BEAN considers them to be synonymous but REHDER retains them as separate species on account of the slightly longer and narrower leaves and the slightly smaller clusters of the more purple-hued flowers of *D. tangutica*. Making a larger bush at 4 feet high is *D.* × *burkwoodii* 'Somerset.' This clone from the cross *D. caucasica* × *D. cneorum* has in late May wonderfully scented blush-pink blooms borne on short leafy stems. Also May flowering, *Viburnum bitchiuense* is by many authorities considered, when a mature shrub at 6–8 feet high, to be superior to the well-known *V. carlesii* which received this award in 1923 some 25 years previously. These plants may be seen in the collection of viburnums to the west of the Award of Garden Merit Collection. This collection is situated between the Glasshouses and Seven Acres.

Other flowering shrubs recently honoured by this award are the very pretty pink-flowered *Escallonia* 'Apple Blossom,' *Philadelphus* × *lemonei* 'erectus' and *P.* 'Norma,' the creamy-white *Holodiscus discolor* and the flowering bramble *Rubus deliciosus*. The last two carry their flowers well into July and even August in favourable seasons and thus merit consideration for inclusion in a shrub border where so often the main effect is concentrated in April, May and June and the mid-summer season is usually rather blank with the border only becoming of interest again when the berried shrubs colour.

The berried shrubs which have received this award include two cotoneasters, *C. conspicua* var. *decora* and *C. franchetii* var. *sterniana*; both deserve representation in gardens. *C. conspicua* var. *decora* carries its fruits well into the New Year and at Wisley on the bank to the south of the Glasshouses it has been known to carry the previous season's

berries when producing the new season's flowers. The merits of the other shrub were fully discussed in the January JOURNAL.

A plant suitable for the front of either the herbaceous or the shrub border is the rampant grower *Ceratostigma plumbaginoides*. It carries in late summer vivid deep blue flowers on stems 1½ feet long. Although hardy it appears to flower more freely in southern England than it does in more northern parts. Also with deep blue flowers in late summer is *Salvia ambigens*, commonly known in gardens as *S. coerulea*. Another salvia given the Award of Garden Merit and well represented during June in the Wisley herbaceous border is the Grecian *S. haematodes* which normally is treated as a biennial, being easily raised from seed. The scarlet *Lychnis chalcedonica* is one of the easiest plants to grow and particularly appreciates a site in full sun as does *Achillea filipendulina*. The rich yellow flowers of the latter are carried in flat terminal corymbs often 5 inches in diameter. Also appreciating the sun *Dictamnus albus* var. *ruber*, more often known as *D. fraxinella*, is the purple-flowered form of the "Burning Bush," a herbaceous plant whose flowers produce a volatile oil which on a still day can be ignited with a match. This plant may be seen in the border which divides the Rock Garden from the Wild Garden, while on the Rock Garden itself *Kniphofia galpinii*, from the Transvaal is at the height of its glory in September when its clear orange, pendulous flowers are carried on a dainty stem 2–3 feet high. *Rudbeckia* 'Herbstsonne' is a bold plant for the back of the herbaceous border, with bright golden-yellow flowers appearing in late summer. Also late flowering is *Physostegia virginiana* 'Vivid,' while for blooming in May there are for the moist position, *Primula helodoxa* and *P. prolifera*, both of which usually may be seen to perfection in the Wild Garden. Also planted here is *Lilium pardalinum*, a fine plant on its own account and also notable as being one of the parents of *L.* 'Bellingham Hybrids' which attract at Wisley so much attention in July. Other lilies recently to receive the award include *L. candidum* and *L. davidii* while of spring-flowering bulbs we may note *Chionodoxa luciliae* and *Tulipa sprengeri*, and of autumn-flowering *Crocus kotschyanus* and *Colchicum speciosum* var. *atrorubens*, *C.* 'Princess Astrid' and *C.* 'Mr. Kerbert.' For best results these autumn-flowering bulbs should be planted in August or early September.

PLANTS OF INTEREST AT WISLEY DURING SEPTEMBER

ENTRANCE AND LABORATORY WALLS

Amaryllis belladonna
Campsis grandiflora
Clerodendrum bungei
Colletia armata
Cotoneaster horizontalis
Nerine bowdenii
Perovskia atriplicifolia

GLASSHOUSES

Abutilons in variety
Buddleia asiatica
Calceolaria pavonii
Fuchsia microphylla
Lonicera hildebrandiana
Sphaeralcea fendleri
Vallota speciosa

WILD GARDEN
Cyclamen neapolitanum
Cyrilla racemiflora
Disanthus cercidifolia
Gentiana asclepiadea
Pernettya mucronata

FLORAL TRIAL GROUND
Trials of Begonias
„ „ Chrysanthemums
„ „ Dahlias
„ „ Perennial Asters

VEGETABLE TRIAL GROUNDS
Trials of Summer Cabbages
„ „ Sweet Corns
„ „ Vegetable Marrows

SEVEN ACRES
Barberries in variety
Buddleias in variety

SEVEN ACRES—(*continued*)
Cornus in variety
Euonymus in variety
Heather Garden
Prunus sargentii

ROCK GARDEN AND ALPINE HOUSE
Crocus nudiflorus
„ *speciosus*
Gazanias in variety
Gentians in variety
Helichrysum frigidum
Hypericum 'Rowallane Hybrid'
Kniphofia galpinii
Schizostylis coccinea

HERBACEOUS BORDERS
Anemone japonica varieties
Asters in variety
Rudbeckias in variety
Solidagos in variety

R.H.S. FLOWER SHOW

July 12 and 13, 1955

ALTHOUGH this Fortnightly Show was not a large one it proved of unusual interest not only for the variety of the exhibits but for the very fine quality of some of them. Under the clock there was a very large exhibit of delphiniums, arranged in three tiers, which received a well-deserved Gold Medal. The enormous bunches of long spikes in a wide range of blues, mauves and purples made a fine background for the other exhibits in the hall. Outstanding was the very pale blue 'Anona' with a white eye and a slight tinge of mauve at the edges. 'Charles F. Langdon' was certainly one of the outstanding medium blues with a conspicuous black eye, and 'Marion' with its large individual florets of rich sky-blue was another excellent blue. One of the outstanding silvery mauves was 'Silver Moon' with very large smooth flowers with a clear white eye. In the darker shades were the deep violet 'Startling' and 'Minerva,' violet with a black and gold eye.

The Lily Group staged an outstanding exhibit containing over 140 entries. There were more pot plants than usual and a wide range of cut specimens. Lily species were particularly well represented, including *Lilium canadense*, *L. roezlii*, *L. pardalinum* and *L. martagon* from Wisley.

OLIVER E. P. WYATT sent a particularly lovely stalk of pale gold *L. szovitzianum*. Species from the Royal Botanic Gardens, Kew, included a fine stalk of *L. canadense*, *L. roezlii*, *L. hansonii* and the lovely yellow *L. parryi*, one of the finest of all North-American lilies.

The contribution from the Commissioners of Crown Lands at Windsor was very large. Fine plants of *L. giganteum* about 8 feet tall formed the central motif. No lily is more impressive in size, although the fine 'Bellingham Hybrids' from both Windsor and Wisley were nearly as tall and of spectacular beauty with their multiple pendulous flowers in shades of yellow and red. Also from Windsor were a good selection of DE GRAFF'S upright and outward-facing lilies, including 'Enchantment,' which was awarded an F.C.C., 'Joan Evans,' 'Tangelo,' 'Campfire' and 'Pagoda.' Species from Windsor included *L. nevadense*, *L. japonicum*, *L. duchartrei* and *L. michigangense*, which received an A.M.

Of particular interest was a new lily 'Edith Cecilia,' shown by MRS. URQUHART and raised in Canada from a cross between *L. cernuum* with *L. davidii willmottiae*. It was graceful in habit and of unusual colouring, combining pale apricot, mauve and rose. Other similar flowers from the same cross shown by MRS. URQUHART were 'Pink Charm' and 'Burnished Rose.'

White lilies always have a great appeal and these included *L. candidum*, *L. longiflorum* 'Croft,' *L. formosanum*, *L. philipinense*, endless *L. regale* and even a fine specimen of *L. leucanthemum* var. *centifolium*. There were several spikes of *L. auratum*, an especially fine one coming from MRS. MESSEL and the National Trust at Nymans.

For the lily enthusiast there were dozens of other interesting hybrids, including 'Winter Sunset,' 'Gold Dust' (A.M.), 'Beltsville Tiger' (A.M.), shown by COLONEL F. C. STERN, and the pale yellow striped apricot 'Marlyn Ross' and a fine apricot *L.* × *aurelianense* seedling with pale green stamens from MRS. E. TENNANT. It is unfortunate that more people did not avail themselves of the opportunity of enjoying this well-staged exhibit which contained many plants of great rarity and extraordinary beauty.

An interesting exhibit of hybrids produced by DR. NORMA PFEIFFER of the Boyce Thompson Institute at Yonkers, New York, by crossing *L. auratum* with both *L. japonicum* and *L. rubellum* was flown from Strawberry Hill, Rhinebeck, New York. These showed great variation in form and colouring and they opened up interesting vistas of new lilies. There was also an attractive group of *L. hansonii* and *L. pardalinum* and forms of *L.* 'Marhan' from a Dutch firm.

For the rose lover there were fine exhibits of both old-fashioned and modern hybrids. Among the former on a stand covered in pale green were great arching sprays of the purple and mauve rose 'Rose Marie Viaud,' in happier days known to most of us as 'Amytheste,' *soulieana*, and 'Raubritter.' The deep velvety crimson-purple of 'Rosarie de Hay' and the loosely shaped rich pink *Rosa gallica* 'Empress Josephine,' now *francofurtana*, were two of the many choice roses. Among the two

exhibits of modern roses there were superb bowls of 'Frensham,' 'Masquerade' and 'Moulin Rouge' and 'Charles Mallerin,' 'Karl Herbst,' 'Lady Belper,' 'Peace,' 'Cynthia Brooke' and dozens of others.

Two nurserymen featured herbaceous material which was seasonal. One showed a pleasant colour combination of lupin, campanula, sidalcea, phlox and dozens of others. The other included with the more usual herbaceous plants both *regale* and *auratum* lilies, fine *Iris Kaempferi*, and hemerocallis, many of great interest, including the striking 'Bold Courtier,' 'Glowing Gold' and 'Lochinvar.' These are lovely plants which come at a useful period when the first flush of flowers in the border is over.

In the centre of the hall was a fine exhibit of paeonies with delphinium. Included among the former were both singles and doubles and the great glowing scented globes are certainly to be recommended for every garden where space permits. The dainty primulinus gladioli were shown on another stand and on another a fine display of standard fuchsias with *Hydrangea paniculata grandiflora*.

The fruit and vegetable competitions are always fascinating, with superbly grown produce which makes one's mouth water. From the Model Fruit Garden at Wisley was an exhibit of soft fruit, including outstanding varieties of currants, gooseberries and raspberries.

The Sherman Hoyt Silver Trophy for the best Amateur Exhibit of Cacti and/or Succulents was won by MRS. D. F. THURLBY of Elstree, Herts., for a well-selected and well-grown collection of interesting varieties. Several firms showed small but tempting exhibits of cacti and succulents and there was a colourful stand of house plants with saintpaulias predominating in a wide range of colours, particularly whites and pinks.

In the Old Hall the British National Carnation Society's Show was unusually spectacular with a very wide range of colours and types. It is always an attractive show and fragrance is one of its delightful features. As I overheard one woman say, "There is a carnation or pink for everybody, no matter how odd his taste."

QUINTA DO PALHEIRO: A MADEIRA GARDEN

Mildred Blandy

ONE of the almost perfect gardening climates to be found is on the Island of Madeira, a Portuguese possession which lies about 400 miles off the coast of Morocco on about the same latitude as Casablanca. Our garden, the Quinta do Palheiro lies about 1,800 feet up on the eastern slopes of the Bay, about five miles from the town of Funchal, the principal port of the island. The estate was started by the

Portuguese CONDE DE CARVALHAL in 1801 and was bought in 1885 by J. B. BLANDY. Since then it has been owned by successive members of this family.

The estate covers 800 acres, about thirty of which form the garden. Much of the rest is farm land, and the pleasant sloping fields planted to corn are noteworthy on an island where the main crops are sugar cane, bananas and vines. These cannot be grown at Quinta do Palheiro because of the high altitude. Instead crops are cultivated which include wheat, maize and barley with vegetables and fruits such as strawberries, raspberries, boysenberries and the ordinary English stone fruits. Many varieties of citrus do well.

The soil though shallow is volcanic in origin and rich. Quinta do Palheiro, like the rest of the island of Madeira, is completely lime-free and this helps to explain the phenomenal growth of camellias. Large quantities of lime have to be brought from the nearby island of Porto Santo for those crops requiring it, and the soil is constantly fed with manure compost to enrich it further.

It is a gentle climate with winter temperatures varying between 45° and 60° F. and summer ones between 65° and 80° F. The winter rainfall amounts to 30–40 inches between November and March, although there is little during the rest of the year. In the summer there are long periods without rain; thus some means of artificial watering is a necessity, and this is done by the "levada" system. On the mountains there is a much greater rainfall than elsewhere; these rains feed perennial springs which flow via the ravines to the sea. With the object of utilizing this precious water many hundreds of "levadas," i.e. cement or stone channels, have been made and water from high places in the hills is carried down these channels to the lands which require irrigation (Fig. 83).

Established trees and shrubs do not have to be watered but lawns, borders, flower beds and all new plants have to be irrigated constantly, and this involves a good deal of labour in the summer months. Fortunately, labour is cheap and plentiful.

There is a considerable amount of mist over the garden at certain seasons, probably caused in part by the quantity of vegetation at a comparatively high altitude and in part by the lack of strong winds to blow it away. In the winter, clouds gather and the garden is often shrouded in mist while the sun may well be shining at higher or lower altitudes. This encourages quantities of lichens to grow on the trees and these we have never succeeded in stamping out. The mist is obviously beneficial to plant life and it helps to explain both the luxuriance of growth and our success with plants like the more hardy rhododendrons and tree ferns.

Wind has never been a serious factor and it has not been necessary to plant windbreaks as is so often the case with gardens on islands. As a result gardening is particularly favourable for there is the even temperature free from extremes, a complete absence of frost, ample water supply and fertile soil. Certainly, it is a gardener's paradise.

For the most part, the gently sloping ground is thickly wooded. *Pinus pinaster* (*maritima*) is most commonly planted, with *P. radiata* (*insignis*) and *P. pinea* a close second; a planting of *P. patula* is a recent experiment.

My imagination was so fired by the description of the Mount Mlanje cedars (*Widringtonia whitei*) of Nyasaland in a book by LAURENS VAN DER POST, that I obtained seed from the Forestry Department there; this has germinated freely and is shortly to be planted on a hillside.

In plan the garden falls into two main divisions—the part centred around and in front of the present dwelling-house—and the lower part below the old chapel. The present dwelling-house was completed in 1891 and occupies a commanding position on a wide terrace facing south with views to the south-west and to the south-east towards the Deserta Islands. Near the house is the present garden, made over the last seventy years (Fig. 84). Trees and plants have been brought from many parts of the world and they have thrived in this warm, damp, frost-free climate, their growth being rapid and prodigious. About a quarter of a mile away to the south and further down the slope is the Old House with its charming chapel close by and it too has its own gardens. To the west is a ravine referred to as the Inferno. But I shall deal with all of these in turn.

From the entrance lodge above the house to the north-west one approaches the New House through an avenue, half a mile in length, with camellias on the south bank and *Acacia cyanophylla* and *A. dealbata* on the north, behind which lie sloping pastures. Beneath these trees thousands of arums grow, giving way to the blue and white of *Agapanthus umbellatus* in the summer and the pink of *Amaryllis belladonna* in the autumn.

When J. B. BLANDY bought the Quinta in 1885 there were already many trees planted near and around the CONDE'S original house. Two great avenues of widely spaced planes with 100 trees on each side, and another of oaks, formed long shade vistas. The entrance to the Quinta had been lined with camellias and in all available spaces these shrubs were planted. These include singles and doubles, reds and pinks, purples and whites, as well as striped and spotted varieties; they show endless variations in form, colour and size. These plants have now grown to magnificent proportions and must number over ten thousand with many varieties. A recent measurement of some of them gave a height of 33 feet although some are getting to an age when they have to be pampered. Of the original group of big *Camellia sasanqua* trees, only five remain. The turf has been lifted for three yards around the trunks of these to help them to assimilate nourishment more readily and this seems to have helped. But with the years the flowers have tended to grow smaller and heavy pruning has been necessary. Even so, it is not possible to check the die-back which obviously is nothing more than the effect of old age (Fig. 90).

Care is taken to preserve existing camellias; all flowers that fall are

allowed to lie unswept and it is this rich accumulation—this soil blanket —which protects the roots, retains moisture and is generally so beneficial in its decomposition of organic matter. Portuguese gardeners, with their passion for tidiness and constant sweeping, find this "leaving of the leaves" an irksome rule. I have tried repeatedly to establish single plants as an object of special beauty in herbaceous beds but the growth and progress is never as great as when planted in the close proximity of clumps or avenues where they protect each other.

In September, a month usually given to attending to trees, all dead wood is cut from the camellias and pruning on a severe scale takes place. In some parts of the Quinta there are hedges of camellias, formal, squat and prim, like any box or privet hedge in England. These flower abundantly in spite of the heavy pruning. This is explained by the fact that the trimming is done with great care and each shoot is considered individually, for the Portuguese gardeners are expert. In other parts the trees spread themselves in length and breadth as they wish. The very tall *C. sasanqua* seed profusely; it is interesting here to recall that hundreds of years ago in Japan these seeds were used as a source of oil. The seedlings are collected and grown on in individual pots. They grow rapidly and give the most suitable stock for grafting purposes when 3–4 years old. Layering, too, is a successful method of propagation, taking two years to establish roots. Strangely, the gardeners seem to prefer these two methods to propagation from cuttings.

The many cultivated forms are derived principally from *C. japonica*, *C. sasanqua*, *C. reticulata* and *C. saluenensis*. Nomenclature of camellias is exceedingly difficult, so many are so closely allied and there are hundreds here still to be identified. We find that differences in foliage are a help in the separation of varieties. Where the plants came from originally we have not traced but they obviously must have come from Portugal and Belgium in the early days of the garden.

Camellias here start to flower in early December and continue until May. Their beauty is indescribable—either on the plant or lying in a thick carpet on the ground. If one can pick out any one variety as being more exquisite than its neighbour, I would choose the one we call 'Water Lily,' i.e. the snow-white semi-double 'alba grandiflora,' with the warm cherry-pink *reticulata* as a very close second. This latter variety may measure from 5–6 inches across. Many camellias are liable to produce "sports"—that is a bloom deviating from the mother plant—an annoying trait and impossible to eradicate.

Entering the grounds of the house one finds large trees on either side, with camellias underneath or around them. In the immediate vicinity are *Sequoia sempervirens*, *Cedrus deodara*, *Magnolia grandiflora*, *Ginkgo biloba*, *Araucaria excelsa* and particularly fine specimens of *Liriodendron tulipifera*.

The house stands on a terrace of small rounded pebbles. These were brought from the sea-shore and the workmen who are highly skilled in the art of embedding them in the earth made paving of

intricate and beautiful design. So skilful were these craftsmen that the paving has survived the many years of hard wear and is still in good condition. Sloping away from this terrace with its lovely views out over the gardens to the sea are lawns intersected with herbaceous borders and rose and clematis pergolas. Interspersed with these climbing roses are plants of *Cobaea scandens*; this climber with its bell-shaped greenish-purple flowers is almost too rampant a grower—constant cutting back only increases its rampageous growth. Here a recently planted *Fremontia californica* has flowered for the first time this year. This part of the garden is well sheltered on the north by a line of *Cryptomeria elegans* together with some *Cinnamonum camphora*, over 40 feet in height, tulip trees and camellias. Nearby, is a group of fine *Cedrus atlantica glauca*; these blue cedars from the Atlas mountains are particularly beautiful in the winter months.

Of recent growth are some silver trees (*Leucadendron argenteum*) from South Africa. Four years ago one of these trees gave cones and from the seed thus obtained over 100 new trees have been raised. Silver trees are comparatively short-lived, but attain a good height and are of extreme beauty. I have frequently been told that the silver tree will not grow outside the Cape Peninsula of South Africa, but here is living proof of their health and happiness on an Atlantic island. Proteas are other strangers that have found a home here. *Protea compacta* and *P. cynaroides* are healthy shrubs.

On the left of the main walk is a group of magnolias (*soulangiana, lennei, alba*, etc.). They range from between 25–30 feet and from December to the end of March provide deep drifts of colour. Other magnolias of recent planting are *Magnolia denudata*, *M. sieboldii*, *M. wilsonii*, *M. sinensis*, *M. stellata* and the closely allied *Drimys winteri*. Closely related to the magnolias, but with their flowers in the leaf axils, are the *Michelias*; two species do exceedingly well here—*M. doltsopa* and *M. fuscata*. Their fruit-like scent is very lovely. Here also are two fine specimens of *Paulownia imperialis* and near them clumps of the brilliant bird-of-paradise flower, *Strelitzia reginae*, and *Gardenia grandiflora*, with its glistening dark green foliage and many double, waxy white, heavily scented flowers which bloom from June to the middle of August.

Also to the left of the centre walk is a sunken garden bounded on the north and south by terraced banks about 8 feet in depth made of local stone. These now form rock-gardens and contain a multitude of gaily hued small plants. Included are many South African natives which, whilst not necessarily "rock lovers," grow happily. *Nerine appendiculata*, babianas, ixias and sparaxis of every colour, *Tritonia crocata*, *Haemanthus katherinae*, *Aristea capitata*, *Dierama pulcherrima*, *Gladiolus tristis*, *Ursinia anethoides* and *Arctotis*. Amongst the most exquisite of the many true blue flowers from South Africa which thrive are the small *Roella ciliata*, *Felicia bergeriana*, *Aristea capitata* and *Oxypetalum coeruleum*. Then there are the greedy mesembryanthemums, on sufferance only because of the brilliance of their magenta, satin-pink

and orange flowers. Growing out of the low walls surrounding the pool in the centre of the sunk garden are numerous *Aeonium arboreum* which I found growing on the rock-face on the north side of the island. It has flourished here, and from December to March its stiff rosettes of fleshy leaves and bright yellow flowers give a splash of colour to a part of the garden which is not usually colourful until March.

Leaving this part of the garden one crosses a series of small pools falling away in different levels. In the spring these pools are edged with freesias and scarlet tritonias, whilst on the banks wild yellow lupins grow between many varieties of azaleas. In the autumn the belladonna lilies and nerine hybrids replace the lupins, the nerines attaining a height of 36 inches.

From the pools one crosses lawns to the charming old chapel of São João. Built by the CONDE in a simple baroque design, it forms a peaceful halt amidst its surround of trees, grass and water. A *Pinus radiata* of immense girth and height stands sentinel over the chapel, with a row of *Cupressus lusitanica* directly south (Fig. 91).

An avenue of camellias is now crossed and the second part of the garden is approached by a herbaceous border. This is known as the "Jardin da Senhora." This has great charm for there is an abundance and lushness of bloom in a perfect setting of old trees and flowering shrubs. Roses, lilies, daturas and other good plants have been established here for years. A pleasing feature are terra cotta flower pots covered with a layer of bark from the cork trees which grow on the estate. The soft grey, rough-textured covering makes a lovely foil for the green foliage and the brilliant colouring of the flowers. Herbaceous borders are treated much as they are in England. Every three years they are lifted in part and replanted, save for clumps which do not need attention (Fig. 88). Pergolas of roses, wisteria, *Holmskioldia* (so frequently mistaken for *Bougainvillaea*, which is better at lower altitudes), the Australian *Kennedya nigricans*, with its racemes of deep purple pea-like flowers and the Zimbabwe creeper (*Podranea ricasoliana*) with its funnel-shaped pale pink blooms striped with red, lead through an archway of *Bignonia grandiflora* and a series of terraced levels lie before one. This frequent change of level adds greatly to the interest of the garden and the whole site at the Quinta with its gentle slopes makes endless possibilities for terraces and sunken gardens. Attractive climbing plants in this part of the garden are *Aristolochia elegans* and *Mandevilla suaveolens*. A handsome scarlet clerodendron refused to flower for five years. Then after a particularly hot summer it burst into bloom and has flowered regularly ever since.

From the "Jardin da Senhora" are visible trees from many parts of the world. Most impressive, perhaps, is a gigantic *Araucaria brasiliensis*. A group of *Pinus canariensis* stand close to a catalpa and a *Wigandia caracusana* 20 feet high. Metrosideros from New Zealand, known there as the Christmas tree, is covered in June with small crimson bottle-brush flowers. Beloved of the bees, it is one of the loveliest of the

flowering trees. The coral and pink flowering eucalyptus from South Africa blend with the pink *Lagerstroemia indica*. Here too are specimens of Judas tree (*Cercis siliquastrum*), African hemp (*Sparmannia africana*), Japanese bitter orange (*Poncirus trifoliata*) as well as drimys and magnolias. A group of *Cupressus funebris* with their dark foliage tower over a large planting of *Datura sanguinea*. The last produces quantities of cream and orange blossoms all the year round and attains great height.

On one of the terraces is a knot garden worked in golden box, with, as its centre-piece, a shallow stone pool planted with the miniature yellow water lily. Passing down another terrace, one encounters two long narrow lily pools with cupressus planted at each corner. These trees were grown from seed from Hadrian's Villa. The pools are filled with water lilies of all colours, a late addition being the "pink lotus."

Leaving the "Jardin da Senhora" one comes to a part of the Quinta completely different in character. The Old House stands with lawns in front and three large ornamental rectangular pools. Many climbing plants twine gracefully over the wrought-iron railings of the surround. Here blue *Plectranthus* from Rhodesia, scarlet lobster plant (*Clianthus dampieri*) and golden *Coronilla* vie with each other for a peep into nature's looking-glass. A clump of *Cyperus papyrus* grows to great size in the lowest pool (Fig. 86).

Nearby are more camellia avenues and conifers including *Cupressus lawsoniana*, *Pinus montezumae*, *P. excelsa*, *Picea orientalis*, *Abies grandis*, *Agathis australis*, *Podocarpus totara* and *Araucaria bidwillii* with its cones 7 inches in diameter.

The Chinese persimmon (*Diospyros kaki*) gives an abundance of fruit and its brilliant foliage in November remains long after other deciduous trees have lost theirs. Growing in the shade and shelter of these persimmons are orchids; it is surprising that cymbidiums and cypripediums grow entirely out of doors at this altitude of 1,800 feet; the former will grow up to 6 feet and have as many as twenty-seven blossoms on a stem. They make a colourful display from February to late in May. Other varieties of orchids, such as dendrobiums, cattleyas, coelogynes, and sobralias, will not grow out of doors here, but are found in an adjacent greenhouse together with ferns, anthuriums, and philodendrons (Fig. 89).

Amongst the indigenous trees of Madeira found in the Quinta are the beautiful lily-of-the-valley tree (*Clethra arborea*), the dragon tree (*Dracaena draco*), the giant heath (*Erica arborea*), the Madeira holly (*Ilex perado*), the island ebony (*Oreodaphne foetens*), the jasmine-scented *Pittosporum coriaceum* and the fragrant white *Notelaea excelsa* (*Picconia*). These native trees are of interest to visitors to the island.

Behind the Old House one climbs to further lawns with large plantings of blue hydrangeas and blue and white agapanthus; tree ferns from the Azores and the Drakensberg mountains of Natal lift their feathery fronds high over this "blue sea" (Fig. 87). Here the garden ends and the woods start—but that is another story.

The Portuguese gardener is the gardener "par excellence," as is evidenced by his success in California, South Africa and elsewhere. These humble people take great pride in their work and are especially expert in the art of topiary. Many fine examples are found in Portugal itself. Here in Madeira, besides box-topiary, much use is made of *Muehlenbeckia*; strange and varied are the examples at Palheiro, ranging from graceful swans to a fat and pompous moose. The interlacing twiggy habit and the small leaves lend themselves to clipping and training.

Superstition is much in evidence amongst the gardeners—transplanting of trees or shrubs can only take place when the moon is at a certain phase. The highly aromatic *Diosma ericoides* is always planted in any new bed; this supposedly insures success to the planting. Many is the time I have removed this plant only to find it replaced!

The planting of *Cupressus sempervirens* is regarded with dismay by José, the excellent head gardener. It is associated in his mind with cemeteries and sadness and he cannot understand why its slender height and grace is so appreciated.

Roses are exceptionally good in Funchal but here they have never been quite so successful nor do they give as large blooms as in England. There are many of the old varieties, including a fine plant of the climbing 'Fortune's Yellow,' now well over fifty years old. Recently a collection of many new varieties such as 'Eden's Rose' and 'Radar' have been imported and I have high hopes for these. It is probable though that roses grown in Spain and in the South of France budded on to different stocks than those used in England will prove more successful.

So far I have mentioned successes with plants. But there are many failures. Gentians, lilies of the valley, paeonies, and Russell lupins do not take kindly to the garden and repeated attempts have never yielded happy results for long. Certain shrubs like forsythia are not at their best, probably because they do not get a long enough resting period due to the very mild winter season. This, in fact, proves more of a handicap than one would think.

There is one other part of the garden which perhaps merits a visit. It has been affectionately dubbed "The Inferno." This is a rocky basin backed by cliffs which lies to the south-west of the New House. A trickling stream supplies unlimited moisture and tree ferns and rhododendrons thrive in the heavy shade. Many of the trees have the root-climbing *Monstera deliciosa* clinging to them. This clumsily named plant gives huge shell-shaped parchment-coloured flowers of classical beauty. After flowering, the cylindrical spadix forms a cob-like fruit, 6–8 inches long; when really ripe, this can be eaten and has a slight taste of pineapple. This is a pleasant spot, particularly on a summer's day, and here the rate of growth is truly remarkable.

I have frequently tried to grow some of the many lovely flowering trees and climbing plants which are found in the streets of Funchal in the public gardens, and in the many interesting private gardens. Due,

however, to our altitude I have not been successful. To name but a few which are worthy of attention by any flower-loving visitor to Madeira: the three species of *Erythrina* (*crista-galli, caffra, tomentosa*), *Sterculia acerfolia, Chorisia speciosa, Calodendron capense, Spathodea nilotica, Frangipani, Poinciana regia* (a good specimen is found in the Public Gardens). Of the climbers, the following are particularly beautiful: *Petrea volubilis, Antigonon leptopus, Allamanda cathartica, Combretum abbreviatum, Thunbergia grandiflora.*

Many magnificent collections of orchids are grown with intelligence and skill. No visitor to this island can arrive or leave without being overwhelmingly aware of the bougainvillaeas—numerous varieties cover walls, houses, and gates with indescribable brilliance and beauty.

Editor's Note: The Palheiro garden is open to visitors every day of the week, except Saturdays and Sundays throughout the year. An entry fee of 5 escudos (1*s.* 3*d.*) is charged: this money goes to the English Church on the Island, with a share for the Roman Catholic Convent of Santa Clara.

ELECTRIC HEATING IN HORTICULTURE

E. W. Golding

(*Lecture given on March* 8, 1955; MR. F. A. SECRETT, C.B.E., F.L.S., V.M.H., *in the Chair*)

ALL gardeners, whether they be amateurs or professional growers, are very familiar with the complexities of horticulture; a list of all the requirements for bringing a well-grown crop to maturity would be of considerable length. Assuming that one has good seed in the first place, these requirements can be conveniently divided into two groups:—(i) those concerned with the chemical, bacteriological and mechanical conditions of the soil, and (ii) those related to climatic conditions using the word "climatic" in its broadest sense so that it includes artificially created conditions of which an increased temperature is but one. For ideal cultivation one cannot neglect any of the factors in these groups; they should be combined so that optimum relative values—if these could be stated—were used. In spite of the large amount of research which has already been done on the subject it is still impossible to give a "recipe" for ideal growth even for any particular plant, although the work of plant physiologists, e.g. that of DR. F. W. WENT in California, has brought the achievement of this aim much nearer.

The dictionary defines an art as "the employment of means to the accomplishment of some end, directed by science and skill." Horticulture fits this definition well. Modern practitioners of the art of gardening are calling increasingly upon science to assist them in obtaining good results. Especially in countries like Britain, where the natural climate is often unkind, the improved climatic conditions

afforded by such devices as glasshouses, frames and cloches enable us to produce crops which it would otherwise be impossible to grow or which would be very late in maturing.

CLIMATIC CONTROL

Having afforded the protection of a glasshouse it would be possible, though almost certainly uneconomic, to call on science to provide the complete control of the growth factors—heat, light, humidity, carbon dioxide content of the atmosphere—necessary to supply all the ingredients in the growing "recipe." There is little doubt that the scientists and engineers could answer this call without much difficulty and the ease of control which is closely associated with electrical operation, whether it be for heating, lighting or motive power, would enable it to play an important role in such ultra-scientific horticulture. But we are still far from accepting either the need, or even the desirability, of completely controlled methods for general practice, although they may possibly be advantageous in special cases.

We are concerned here particularly with one aspect of the control of growth factors—the provision of heat by electrical means. And although during recent years much progress has been made towards establishing the technique of combining heating with artificial illumination, we shall avoid complication by considering only the former in detail. It can be generally agreed that heating is often needed for the soil in glasshouses and in frames and perhaps even under cloches or in open ground; it is needed also for the air in glasshouses. Again, for the ancillary, but very important, purpose of soil sterilization it is a dependable, though not so commonly accepted, method.

ELECTRIC HEATING

Electricity has advantages as a source of heat for horticulture; it is convenient to use, can be precisely and simply controlled, adapted easily to different purposes and, in particular, can be provided exactly where and when it is needed. But if used indiscriminately it may certainly prove expensive. Electricity provides a "high-grade form of heat," which can be explained by saying that all the heat losses involved in the energy conversion from the coal by which the electricity is produced, occur before it arrives at the consumer's premises. Electric heating must, therefore, be applied by methods which match its highly efficient quality.

The Rural Electrification Section of the Electrical Research Association, at the Shinfield (Reading) Field Station, has been making investigations on this subject during the past ten years. Its work is continuing and the results are being brought into horticultural practice, aided materially, of course, by the electrical manufacturers of the appropriate equipment. To the utmost possible degree the aim of these experiments is the eventual development of electric heating applications which will prove economic in practice but, as with any alternative methods, this

economy is inevitably influenced, for the commercial grower, by variations in market prices for his produce as well as by his operating schedules and growing techniques. The best that can be done by the research worker is, first, to ensure that the method, as developed, is practicable, effective and potentially economic, and then to state the operating costs as accurately as possible so that the user can judge its possibilities when applied under his own particular circumstances.

Among these applications are soil sterilization (for which purpose the soil temperature must be raised to a high value which is, however, maintained for only a short time), soil warming under various growing conditions, and space heating in the glasshouse for both of which a much smaller increase in temperature is needed though it must be maintained for a much longer time. In the glasshouse, soil warming and space heating can be combined with advantage.

RAISING THE TEMPERATURE OF THE SOIL

To increase the temperature of the soil by a specified amount, a calculable quantity of heat, or of electrical energy, expressed in kilowatt hours (kWh), is needed; to maintain this temperature there must be a certain rate of heat provision, expressed electrically as power in kilowatts (kW), to counterbalance the heat losses to the surroundings. The energy required, per cubic foot of soil, to raise the temperature 1° F. increases with the moisture content and varies from 0·003 kWh to 0·012 kWh. For soil sterilization, a temperature of at least 160° F. must be attained. Allowing for heat losses in the process, the energy consumption is of the order of 2 kWh per cubic foot when the initial soil temperature is (say) 50° F. Consumptions of 1½ to 2 kWh/cubic foot were measured in the experimental work done when the electrically operated sterilizer for potting soil was under development. This equipment (see Fig. 93), which is now on the market in a modified form, had tubular heaters immersed in the soil and sterilized 2 cwt. of soil in 1½ hours. Another form of soil sterilizer uses the electrode principle, an electric current being passed through the soil itself thereby heating it. Research on the electrode method aims at its application to the sterilization of glasshouse soil *in situ*. This might be both a convenient and economical method but there are technical problems to be solved before it can be put into practice.

SOIL WARMING

Soil warming—as distinct from the high-temperature heating needed for sterilization—is used to raise the soil temperature by only a few degrees to assist growth, usually under the protection of frames or cloches or in the glasshouse. Little growth occurs with most horticultural crops when the soil temperature is under 40° F. but an extra 5° to 10° F. brings about much more favourable conditions.

Two forms of electric heating equipment are available. One is a soil warming cable, insulated and operating at mains voltage, and the other

is a grid of bare wires, generally galvanized steel, supplied from a transformer which steps down the voltage to a low value of 6 to 35 volts (according to the size of the installation) which is safe even with bare (uninsulated) wires. The insulated cables have been used particularly for small installations in frames and glasshouses and for propagation work, when they can also be used to give a little air warming. The low voltage method, which is confined to A.C. supplies, has been widely used for small frames and for commercial frames and glasshouses and under cloches. The wires are laid at a depth varying from 6 to 15 inches, according to the purpose of the warming, and at varying distances apart up to about 1 foot. Shallow laying is necessary in frame hot beds when the need is particularly to raise the temperature of the top few inches of soil during the most severe winter weather. Laying at greater depths is practised to facilitate cultivation when the wires are to be left undisturbed for several years in a glasshouse. With cold surface soil the heat passes upwards because the subsoil is warmer, but, later in the year, when the top soil warms up, there is a tendency for the heat to pass downwards into the cooler subsoil. Measurements of soil temperature in the south of England have shown that the monthly mean temperature at 1 inch depth, during the period March to September, is higher by 2° to 4° F. than at 3 feet deep, but during the winter months the subsoil at 3 feet is warmer by some 2° to 3° F.

THERMOSTATIC CONTROL FOR PROPAGATION

The maintenance of a definite minimum temperature by means of a thermostat is necessary in some cases, particularly for propagating frames and benches. Table I gives examples of the propagating temperatures required.

TABLE I

PLANT	OPTIMUM SOIL TEMPERATURE (approximate)
Seed germination	° F.
Peas, cabbage, spinach	45 to 50
Beet, broccoli and cauliflower, parsnip, turnip, parsley	55 to 65
Cineraria, delphinium, larkspur, antirrhinum	
Asparagus, carrot, celery, lettuce, onion, tomato	65 to 75
Aster, carnation, cyclamen, dahlia, lupin, stocks, gypsophila, sweet pea	
Cucumber, sweet corn, melon	75 to 85
Pansy, Iceland poppy, foxglove, lobelia	
Cuttings	
Conifers	50 to 55
Carnations	60 to 70
Roses	70
General	60 to 75

The thermostat controls the power input so that it is switched off when the desired temperature is reached and only comes on again when the temperature falls below this value. This ensures, therefore, that the electrical energy consumed is the minimum needed to maintain the temperature.

In achieving the necessary temperatures electricity is particularly useful in providing, through a soil-warming unit, bottom heat for the propagating bench (see Fig. 94) in a glasshouse the air temperature in which would not otherwise be sufficiently high—unless a heavy heating cost were incurred. An air temperature of (say) 50° F., with soil warming, may be used to give as good results, especially for rooting cuttings, as an air temperature of some 10 to 15 degrees higher without soil warming.

A useful device is the propagating case which enables a suitable, and very local, micro-climate to be created economically within a cool house. The case can be separately heated by a soil-warming cable attached to its inside walls. As well as for propagation it can be used for a small number of plants which may need warmer conditions than those in the rest of the glasshouse.

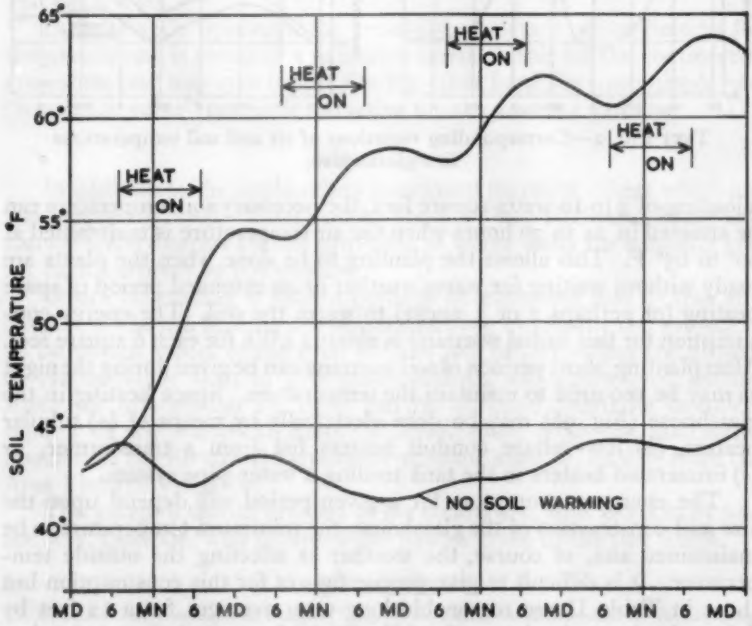
When larger masses of soil than those used in propagating are involved it is not always realized by the user, however, until too late, how much heat (or electrical energy which supplies this heat) is required to hold the soil temperature to the value which he has chosen in setting his thermostat. In this respect the precise control which is afforded by electrical operation appears to be a disadvantage until the grower becomes familiar with it. Reduction of the thermostat setting, by even two or three degrees, often brings about a very considerable saving in the energy consumption over a period of time so that the user should be *sure* that he really needs a high soil temperature before committing himself to a heavy consumption by setting his thermostat high.

THE DOSAGE METHOD OF SOIL WARMING

For frame hotbeds, thermostatic control was used with electric soil warming when this was first introduced in the period between the two world wars, but there was no accurate information available on the soil temperature needed so that the energy consumption varied with the ideas of the gardener. In fact, provided sufficient warmth is given to the soil to allow growth to proceed whenever the light is adequate, the actual soil temperature does not appear to be critical; a maintained increase of 5° or even 10° F. may not result in any significant reduction in the growing period during the early spring months, especially if the weather continues dull. This fact led to the introduction, by the Electrical Research Association, during World War II, of the so-called "dosage" method of applying electric soil warming. In this method a daily "dose" of energy amounting to 45 to 55 watt-hours per square foot of soil surface (according to the latitude of the place where it was used) was given and was found to achieve the desired result of bringing a crop

of lettuce to maturity in about 10 weeks during January to March. More recent experiments have confirmed that this dose is, in fact, the most economic although, when it was first used, its choice was somewhat arbitrary. A great advantage of the method is that the energy consumption is fixed and known. There is no question of maintaining a particular soil temperature; it is allowed to vary with the weather, leaving the plants to do the best they can with the additional warmth provided. The daily energy consumption is 1 kWh for a frame soil surface area of 20 to 24 square feet so that a growing period of (say) 70 days means a consumption of $1\frac{1}{4}$ to $1\frac{1}{2}$ kWh for each of the four dozen lettuces which can be grown on that area (see Fig. 95). Incidentally, it is important to choose a suitable variety of lettuce for this hot-bed culture and 'Gotte à Forcer' or 'Cheshunt Early Ball' have given the best results in experiments over ten years or more.

The dose of energy can be given at a high rate during the night only or at a correspondingly lower rate during the whole of the 24 hours. The average temperature attained is much the same in the two cases, the soil providing good thermal storage. But the heating during the night may have the advantage of producing the maximum soil temperature some hours later (see Text Fig. 1), when daylight can assist the plant in making the best use of this heat; it is well known that illumination and



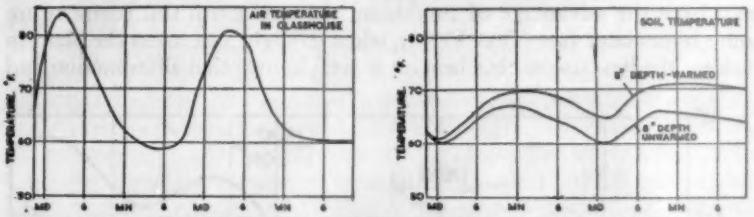
TEXT FIG. 1—Temperature at 6 inches deep midway between heating wires at 8 inches deep. Specific loading $9\frac{1}{2}$ watts/square foot.

temperature should be matched for optimum growth to take place. Partly counterbalancing this advantage, there is the fact that the high rate of heat production, over the shortened time, means a greater power capacity (wattage) in the installation.

It is of interest to note that heat from the sun takes some hours to penetrate to a depth of 6 or 8 inches into the soil so that, at this depth, the maximum temperature may occur in the late evening following a sunny day (see Text Fig. 2).

ELECTRIC HEATING IN THE GLASSHOUSE

Both the soil and the air in the glasshouse need warmth and, because of the rather slow and inefficient transfer of heat from air to soil it is often advantageous to use electric warming to ensure an adequate soil temperature whatever the method used for the space heating. This is particularly true for tomato-growing houses when a soil temperature of 57° to 60° F., at 6 to 8 inches deep, is desirable for planting out. Using a low-voltage grid of warming wires, fed by a transformer, and having



TEXT FIG. 2—Corresponding variations of air and soil temperatures in a glasshouse.

a loading of 5 to 10 watts/square foot, the necessary soil temperature can be attained in 24 to 30 hours when the air temperature is maintained at 60° to 65° F. This allows the planting to be done when the plants are ready without waiting for warm weather or an extended period of space heating (of perhaps 2 or 3 weeks) to warm the soil. The energy consumption for this initial warming is about 1 kWh for each 6 square feet. After planting, short periods of soil warming can be given during the night as may be required to maintain the temperature. Space heating in the glasshouse (Fig. 96) may be done electrically by means of (*a*) tubular heaters, (*b*) low-voltage conduit heaters fed from a transformer, or (*c*) immersion heaters in the tank feeding a water-pipe system.

The energy consumption for a given period will depend upon the size and construction of the glasshouse, the minimum temperature to be maintained and, of course, the weather as affecting the outside temperature. It is difficult to give precise figures for this consumption but those in Table II are reasonable long-term averages for a 12 feet by 8 feet glasshouse in the south of England; they may be greater or less according to the severity of the winter.

TABLE II

MONTHS	Approximate average weekly consumption in kWh (or cost in pence with electricity at 1*d.* per kWh) for maintained minimum of:			
	45° F.	50° F.	55° F.	60° F.
December to March inclusive	70 to 95	135 to 160	210 to 250	290 to 320
November and April	25 to 35	70 to 80	100 to 150	200 to 220
May	10	25	65	120
June to September inclusive	0	1 to 6	5 to 20	25 to 55
Yearly average weekly consumption or cost.	30	60	100	160

The influence upon the running cost, of the minimum temperature to be maintained can be seen very clearly. To ensure that the temperature throughout the year shall not fall below 45° F. costs 2*s.* 6*d.* per week, but if this temperature is to be as high as 60° F. the cost may be some 13*s.* 0*d.* a week.

In large-scale operation the economy of electric space-heating for the greenhouse is certainly a debatable question and for the commercial grower its cost may rule it out. On the other hand, its convenience and "insurance value" render it attractive for the amateur gardener.

CONCLUSION

In addition to the applications mentioned there are others which are less commonly used—water heaters for bulb and sterilizing baths and storage water-heaters for the provision of warm water for spraying and for such purposes as pot washing.

Before concluding it should perhaps be explained that in this discussion of electric heating the object has been to present the subject as an important aspect of the even broader one of controlling the growth of plants rather than to give constructional and operational details. Adequate information on these can be obtained from the technical reports of the Electrical Research Association, from the instructive booklets of the Electrical Development Association or, locally, from the Area Electricity Boards.

The author's thanks are due to his colleagues, MISS R. BECKLEY and MR. A. E. CANHAM, who provided the figures given in the two tables.

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A RECENT ADVANCE IN THE CORRECTION OF TRACE ELEMENT DEFICIENCIES

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THERE has for long been recognition that, whereas the "fertilizer" elements, nitrogen, phosphorus and potassium, constitute the main nutrient requirements from the quantitative point of view, at least another nine elements figure in the basic make-up of all plants.

These are sometimes loosely referred to under the collective term of "trace" or "minor" elements but, in fact, three of them, calcium, magnesium and sulphur, are more correctly defined as "intermediate" elements of plant nutrition as they are required in smaller quantities than the fertiliser elements but in considerably larger amounts than the strictly trace elements, iron, manganese, boron, zinc, copper and molybdenum.

It is with these latter in general and certain of them in particular that I am concerned in this article.

Now, chemical analysis shows that by far the greatest proportion of soils have reserves of the trace elements sufficient to supply the needs of crops for an indefinitely long period of years. That trace element deficiencies do arise quite frequently in a wide range of plants is generally due to an insufficient availability of the reserves to supply even the quite small requirements of these elements.

This is a fact of fundamental importance since it leads logically to the conclusion that factors antagonistic to trace element availability can exist in otherwise fertile soils.

This circumstance is, indeed, verified beyond all doubt by the results of countless experiments over the years which have been concerned with the influence of liming on fertility.

Thus, parallel to the very generally recorded increase in fertiliser element availability resulting from the application of lime in some form, especially with highly organic soils, has been the frequent observation that deficient trace element uptake appears in the wake of a rise in the soil pH due to liming.

It has been shown that the availability of all of the trace elements decrease as the pH figure reaches and exceeds neutrality, with the

exception of molybdenum. In certain cases, e.g. manganese, the effect of high pH is greater when the organic content of the soil is high. The other major factor influencing the availability of the metallic trace elements is, according to increasingly impressive evidence, the level of available phosphoric acid. In theory this is logical since the phosphates of these elements are of the same order of insolubility as the basic carbonate complexes considered to be formed under conditions of alkalinity.

It would seem then that we are concerned with potential plant deficiencies of iron, manganese, boron, copper and zinc (a) wherever the soil is naturally limy or where liming has carried the pH above the 6·3–6·5 mark which is optimum for the growth of the great majority of our plants, and (b) where—as under conditions of heavy "balanced" fertiliser application—phosphates accumulate.

In practice, however, iron and manganese are the only trace elements required in such quantities that excessive free lime of available phosphates are likely to reduce the availability to the plant to a degree sufficient to give rise to significant deficiencies.

Over the years, at least in this country, biochemists have been mainly concerned with induced deficiencies of these two elements and it is in this regard that a significant advance has recently been made.

In 1952, STEWART and LEONARD of the Florida Citrus Experimental Station, Lake Alfred, published a report in the *Citrus Magazine* dealing with the causes and control of iron chlorosis.

They had extended to use on iron-deficient orange trees under field conditions, the discovery by JACOBSEN, L. (1) that the essential iron supply could be maintained in soil-less culture solutions by the use of the ferric salt of an organic complex, ethylenediamine tetra-acetic acid (EDTA).

When used as a dormant season soil application to citrus showing the typical chlorisis and branch die-back of severe iron deficiency, the full green colour of the leaves returned within six weeks and vigorous new extension growth was soon apparent. As little as two ounces of actual iron in this organic form per tree had performed what 15 pounds per tree of sulphate of iron had failed to do.

This work was extended with the co-operation of the Alrose Chemical Co., Providence, a subsidiary of Geigy, and it was through the Geigy Company Limited of Manchester that EDTA metallic trace element compounds were first made available for experimental work in this country in the winter of 1952.

The first name given to this form of preparation was "Sequestrol" and this became a registered trade mark of the Geigy Company. Later, by general agreement, the name "Sequestrene"* was substituted, and today reference is invariably made to "Sequestrene iron", "Sequestrene manganese", and so on.

* "Sequestrene" and "Sequestrene Plus" are registered trade marks of THE GEIGY COMPANY LTD.

The metallic elements in this complex form are referred to technically as being chelated—a term derived from a Greek word meaning "a claw."

Both terms—sequestered and chelated—refer to the property of EDTA and allied compounds of isolating or gripping the metal in such a manner that it no longer exhibits the typical properties of the free compounds of the element.

Thus, for example, if sulphate of iron is dissolved in water and a solution of lime is added, a bulky brownish insoluble precipitate is formed. When Sequestrene iron is treated in the same manner there is no immediate precipitate and breakdown of the complex is slow.

Another range of chelated metallic trace elements has been developed in Sweden under the name of Versenols. It is claimed that they are more effective under very alkaline conditions than the Sequestrenes, but, as yet, little work appears to have been done with them in this country.

I was privileged to have some of the earliest supplies of Sequestrene iron, and work carried out on hydrangeas, in conjunction with Cheshunt Research Station, led to the hydrangea experimental exhibit at Chelsea Flower Show two years ago which readers will doubtless remember seeing.

This particular plant was chosen for the original tests because the foliage shows such obvious yellowing or chlorisis when the pH of the pot soil rises much above six as, in fact, it frequently does due to continual use of "hard" mains water.

Within ten days plants which are so chlorotic as to be almost devoid of green colour, are visibly returning to a normal condition. It should be noted, however, that, whereas a very quick and persistent effect is achieved in regard to the foliage, pink varieties are not "blued" by Sequestrene iron. This would appear to confirm the theory that "blueing" of pink hydrangeas results mainly from pH changes in the cell sap.

Plants which have been "blued" with the usual iron/aluminium compound are often greatly improved in foliage colour by the use of Sequestrene iron, and it has been noted that the intensity and clarity of the blue colour is sometimes markedly enhanced where Sequestrene aluminium is applied at the stage when the inflorescence is just visible.

Other plants which have been found to react favourably are various primulas, camellias, azaleas and rhododendrons, *Solanum capsicastrum*, decorative vines, chrysanthemums, tomatoes and a number of soft and top fruit crops.

The method of application varies somewhat with the subject being treated for chlorosis, but it has been found both satisfactory and convenient to standardize the strength of solution at 1 in 1,000, i.e. approximately 1 oz. in 6 gallons of water.

Sequestrene iron dissolves freely to form a pale brown solution which is stable for at least a period of days even in hard water.

Photo, Vicente, Madeira

QUINTA DO PALHEIRO : A MADEIRA GARDEN

FIG. 83—A view of the Quinta do Palheiro with a series of pools bordered by freesias and tritonias in spring and connected by rills which carry the water through the garden (See p. 401)

FIG. 84—A view from the New House in January, showing the delightful combination of evergreen and deciduous trees with *Cupressus sempervirens* and topiary in the sunken garden in the left foreground (See p. 402)

FIG. 85—A typical view of the garden with a flock of sheep grazing among the arums growing in the shade of a spreading tree of *Michelia fuscata* (See p. 402)

FIG. 86—Three ornamental pools with decorative wrought iron railings reflect the fine specimens of trees in front of the Old House. A large clump of *Cyperus papyrus* is visible in the centre of the furthest pool (See p 406)

Photos, Vicente, Madeira

FIG. 87—The "Blue Sea" of hydrangeas under a canopy of trees matches the blue of the vistas to the sea and is one of the features of the garden in summer (See p. 406)

Photo, Vicente, Madeira

FIG. 88—The "Jardin da Senhora" in June is a riot of flowers, familiar and exotic; cork-covered pots of flowers are used as decorative accents along the paths (See p. 405)

FIG. 89—A pot of cymbidium orchids standing on the pebble-paved terrace. Cymbidiums are grown both in pots for decorative work and in the borders and flower beds in many parts of the garden (See p. 406)

FIG. 90—One of the five remaining very old *Camellia sasanqua* trees which measures 33 feet in height; but now, alas, all are showing signs of old age (See p. 402)

FIG. 91—The chapel of São João, a lovely example of simple Portuguese baroque architecture, stands in a setting of trees and flowering shrubs near the Old House (See p. 405)

Photo, J. E. Downward

NEW PRIMULA FROM NEPAL

FIG. 92—*Primula reidii* var. *williamsii* (collected in Western Nepal, POLUNIN, SYKES and WILLIAMS. No. 3535) (See p. 429)

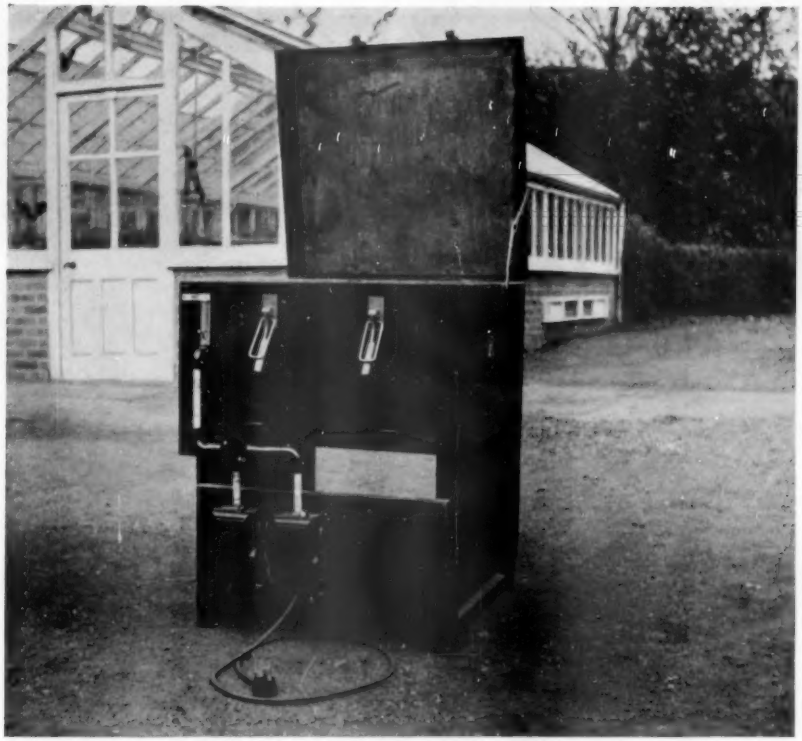


FIG. 93—Electric soil sterilizer, with immersion heaters—E.R.A. prototype
(See p. 410)

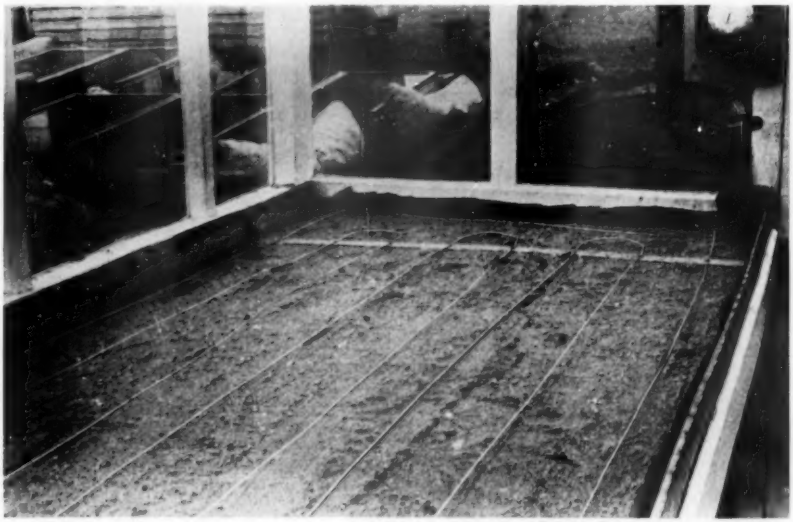


FIG. 94—Propagating bench with soil-warming wires (See p. 412)

FIG. 95—'Gotte à Forcer' lettuce in electric frame hot-bed (See p. 413)

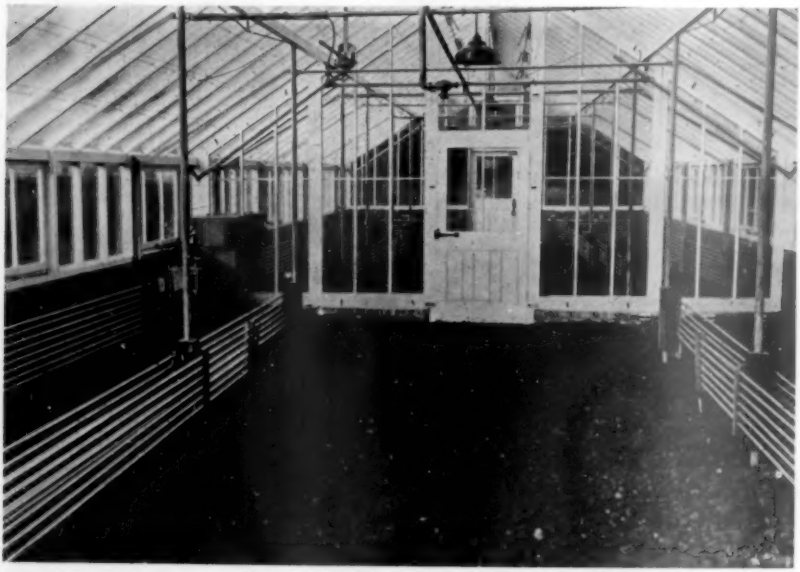


FIG. 96—Low voltage, conduit-type, installation for glasshouse space heating (See p. 414)

With pot plants the solution is used to the extent of a light watering on already moist soil. Row crops, such as raspberries or strawberries, are treated at the rate of 1–2 gallons per yard run of row, preferably when the soil is already moist and when growth is fully active in the spring.

Plants which can be treated individually, such as tomatoes and chrysanthemums growing in the border or field soil, are best treated by applying 1–4 pints of the solution per plant, according to circumstances. Where an area is closely planted, as, for example, in bedding schemes, it is satisfactory to apply 1–2 gallons of solution per square yard.

The necessity for, or frequency of, repeat doses must, at the present stage of knowledge, be determined by the appearance of the plants, and much work remains to be done on this complex aspect of trace element deficiency correction with the Sequestrenes.

During the course of considerable work over the last two years, there has been no evidence that damage can arise from soil treatment on the lines indicated above. It is important, however, that the solution be kept off the foliage, or that the solution contacting low growing plants be washed off before it is dry, with plain water.

Even in Sequestrene form, iron causes appreciable scorching of growth at the 1 in 1,000 strength, and, though this tendency can be minimized by the addition of a wetting agent, foliage application of the Sequestrenes is not recommended on grounds of safety as well as of efficiency.

A limited amount of work has been done in connection with trees, including orchard top fruits. Several instances have been recorded where application of Sequestrene iron—at 2–8 ozs. per tree, dissolved in a convenient quantity of water for application—has resulted in a marked improvement in colour of the foliage and in the vigour of growth.

In order to reach the area of maximum surface root activity, application has been in a broad band between the rows and early spring seems a satisfactory time. With individual trees or bushes, treatment of the whole area overshadowed by the branches is often advisable, and, in such instances, 1–2 gallons of solution per square yard is indicated.

Most of the information so far to hand concerns Sequestrene iron. Work is progressing with the Sequestrenes of manganese and other metallic trace elements, but it is premature yet to attempt precise recommendations.

In a number of cases, however, manganese deficiency has been found to run parallel to that of iron and, to take account of this circumstance and to give the gardener an opportunity of using the Sequestrenes under his own conditions, a Sequestrene mixture has recently been made available through retail sources. This material has been named "Sequestrene Plus", and is based on the Sequestrenes of iron and manganese together with active magnesium. It should have very general application, particularly on chalky soils, and is used as already indicated for Sequestrene iron, but at the more convenient amateur strength of 1 oz. per gallon of water.

It will be apparent that so complex a subject as the correction of trace element deficiencies cannot be covered in more than very brief detail in the course of one article, but a sufficient indication may have been given of the trend of progress as instanced by the discovery and application of the Sequestrenes. Much, very much, remains to be done, but we would appear to have in these materials a most valuable new approach to a problem which has for long ranked as one of prime importance in the effective culture of our garden, orchard and glasshouse crops.

REFERENCE

(1) "Maintenance of Iron Supply in Nutrient Solutions by a single Addition of Ferric Potassium Ethylenediamine Tetra-acetate." *Plant Physiol.* **26**, 411–413, 1951.

NOTTINGHAM PARKS DEPARTMENT HORTICULTURAL APPRENTICESHIP SCHEME

W. G. Ayres, N.D.H.

NOTTINGHAM, in common with many other Parks Departments is suffering from a chronic shortage of trained gardeners—resulting in the main from the closing of many first-class private gardens, the former recruiting ground for this type of worker. It behoves all Departments, therefore, to make their own arrangements for training. I have had so many enquiries recently about the Nottingham training scheme that I cannot help feeling that there is a general awakening to the need to establish training facilities and this brief summary may be of help to those so interested.

My interest in such a scheme was roused by that instituted in 1922 in Manchester at the instigation of the late W. W. PETTIGREW, and when I took up my appointment as Chief Officer of Shrewsbury Parks Department in 1931, I was able to institute a training scheme there. The success with our first intake of two excellent boys spurred me on and when I came to Nottingham in 1936, I did not hesitate to commence a similar apprenticeship scheme here.

I should say that in my opinion such a scheme need not be confined to the larger Departments. Small Departments should also be able to provide training, always providing, and this to my mind is the first essential to any scheme, that there are on the staff, fully trained and experienced men able and willing to tutor trainees under their charge.

A second essential is to secure the co-operation of the Local Education Authority, to provide fullest information for the Juvenile Employment Bureau and the local schools as to the training, prospects and opportunities for trainees. All this helps to break down the common

misapprehension of the gardener's job (often based inaccurately on the jobbing gardener). If possible, I prefer a Grammar School boy, but reasonably intelligent Secondary School boys can make the grade, always provided, and this too is most important, that there is a real liking for gardening—that natural love of the job that makes a real gardener.

Our indentured apprenticeship period is at the present time for three years, and as far as possible, an intake of six new apprentices per annum is recruited (usually we have more applicants than vacancies). This enables new entrants to train with 2nd and 3rd year boys. Apprenticeship usually commences at the age of 16—boys leaving school at 15 serve a year as garden youths. *All* entrants must serve three months' probationary period in any case, before being indentured.

At the present time there are 24 indentured apprentices, 10 of whom have received a Grammar School education. In addition there are 20 garden youths. Some, if satisfactory, will in due time be accepted for apprenticeship whilst the others may not be suitable for inclusion in the scheme, but are used for general duties.

Whilst training, all serve at various Parks, and in addition to receiving instruction are expected to assist in most of the routine work involved on the maintenance of their Park.

Apprentices are moved to different Parks, usually on January 1 each year. This enables them to secure a varied and comprehensive training in the following:—

The production of hardy trees and shrubs.
The production of bedding plants.
The production and maintenance of stove and greenhouse plants.
The arrangement of floral decorations for civic functions.
Maintenance of ornamental areas including trees, shrubs, bedding, etc.
Maintenance of specialized sports areas and other open spaces.
A special feature in the scheme is the cultivation of hardy fruits and vegetables and the culture of vines, peaches, etc., under glass, in the Model Kitchen Garden.

In special cases, practical experience in the construction of Parks features, recreation grounds and sports areas may be made available.

Demonstrations of specialized skills and visits are made when anything of particular interest arises within the Department or any other local horticultural centre.

In the case of any senior apprentice who shows promise, an opportunity is provided for him to receive a three months' period of instruction under the Department's Landscape Surveyor, where he will be given opportunities to practise draughtsmanship and surveying.

Apart from the practical work in the Parks, all garden youths and apprentices give an undertaking to attend the Horticultural Classes with a view to securing the Royal Horticultural Society's Junior and

Senior Certificates. These classes are arranged (a) at Evening Institutes for boys under 18, where Elementary Horticulture is taught, and (b) at the Technical College where instruction in more advanced horticulture is provided; this enables the students of 18 years to take the Royal Horticultural Society's Senior Examination. Both the above evening classes are staffed by Instructors from the Parks Department. All employees and apprentices under the age of 18 years are also required to attend Day Release Classes where instruction in English, Arithmetic, Geography, Civics, etc., is provided for half a day and Botany and the scientific principles of Horticulture for the remainder of the day. A more advanced class in Botany and Horticultural Science is provided for half a day per week to all apprentices until their indentures are complete. In the event of any of these senior lads being in possession of the R.H.S. Senior Certificate, they are encouraged to sit for the N.D.H. qualifying examination, unless, of course, they already possess the necessary educational standard, and also to take the special course on Turf Management.

The recording of the progress of each apprentice is a most important matter, especially in the larger Departments when the youth can often feel like a small cog in a very large wheel. I make a point of interviewing each trainee every six months, armed with a complete dossier of information about his progress in all sections and find this one of my most interesting and rewarding labours.

On the termination of his apprenticeship, the indentures are completed and signed and handed to the apprentice.

After two years in another Department or at Wisley, Edinburgh or Kew, the apprentice is accepted as a trained gardener and paid as such (although I must record, in passing, my dissatisfaction at the present low rates laid down by the National Joint Council). There are then in most Departments, opportunities for further advancement—Propagators, Foremen, Nursery Foremen, Superintendents in charge of grounds—all these positions are open to fully trained men.

Yet further spheres open up for any who may be accepted for training at the Institute of Park Administration Training College. The successful completion of the comprehensive course there, should ultimately secure for the student his first technical or administrative post in a Parks Department. Landscape Draughtsmen, Landscape Surveyors, Horticultural Assistants, Technical Assistants in various specialist jobs, Horticultural Education Officers, Deputies, and eventually Chief Officer posts are all open to the enthusiastic and trained man.

Has Nottingham and the Parks service, benefited from our scheme? Without a doubt, half of those who have finished their apprenticeship are now in administrative positions in Parks Departments, the remainder are serving in Nottingham as technicians, propagators, and trained gardeners—the complete justification of an apprenticeship scheme.

LOUISA LAWRENCE AND HER GARDEN

Geoffrey Taylor

THE average woman in her relationship to the Arts—and among them, of course, to the art of gardening—is more sensitive, more appreciative, and more creative than the average man. Men will, no doubt, admit as much. By universal consent, a woman's place is the flower garden. The most popular books about gardening are written by women. For every edition of Loudon's *Encyclopaedia* there are two editions of his wife's *Ladies' Companion*. But again, as in the other arts, when one comes to consider achievement above a certain level, the great—even the respectable—women gardeners are outnumbered by the men.

So far as gardening is concerned, this sex-distinction could be easily demonstrated. To draw further conclusions from it would be impertinent and very unwise. But, given that it is so, it has the effect of making the important women gardeners stand out the more conspicuously.

LOUISA LAWRENCE was outstanding also as a conspicuous beauty. Not but that, compared with MISS WILLMOTT's, her looks may have been a shade insipid; and one might not have been drawn to her as one would have been drawn to the ugliness of MISS JEKYLL. Nor was she as a gardener in quite the same class with these. For one thing she was also a mother and a society hostess; for another—well, lovely as she was, she had not the look of a great gardener, if the science of phrenology which flourished in her day, means anything.

None the less, MRS. LAWRENCE gained a great reputation by her gardens. She was born in 1803 or thereabouts—she was reticent as to the exact year—the daughter of JAMES TREVOR SENIOR, a Buckinghamshire landowner. At the age of twenty-five, more or less, she married WILLIAM LAWRENCE, F.R.S., the great surgeon, some twenty years older than herself, who restored J. C. LOUDON to tolerable health at a time when all other doctors had given him up.

For the first ten years or so of her married life, MRS. LAWRENCE lived at Drayton Green, then a straggling little village seven miles west of London on the way to Oxford. Here LOUDON visited her at what he called "the Lawrencian Villa" at the end of May, 1838, and he gave a detailed account of her house and garden in *The Gardener's Magazine* for July.

LOUDON claimed, and he knew what he was talking about, that MRS. LAWRENCE'S garden, of rather less than two acres, was the most remarkable of its size in the neighbourhood of London. Drayton Green was set in flat country among small, high-hedged, pasture fields, so that extensive views were out of the question. However, the LAWRENCES were extremely rich, and, having but two acres and no landscape distance, their wealth was lavished on a flower garden. The increase in the number of the suburban rich, who, because they were necessarily suburban, had to make do with small properties, was a main cause of

the great growth of flower-gardening. In fact, flower-gardening was perhaps the new middle-class's best contribution to nineteenth-century civilization.

MRS. LAWRENCE's garden started with no particular advantages as to shape or aspect. It was rectangular, about twice as long as it was broad, and its length ran due east from the drawing-room windows. Also it ran uphill at the rate of one foot in fifty—which LOUDON considered

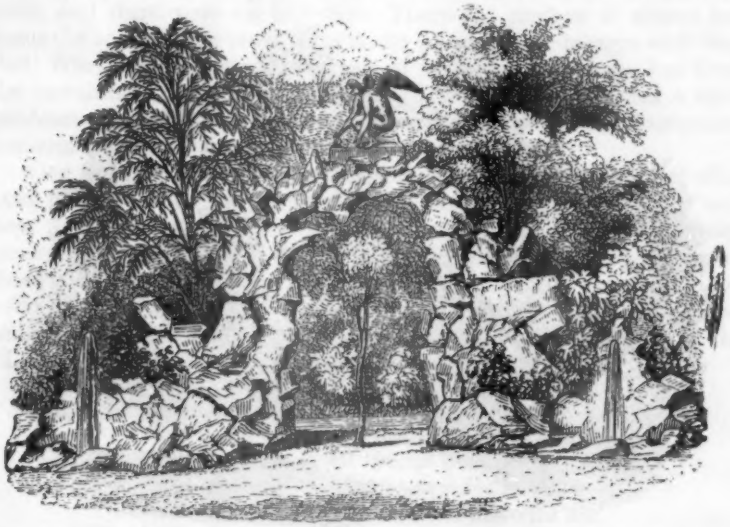
TEXT FIG. 3—A view of the flower beds at the Lawrencian villa, Drayton Green, from *Loudon's Suburban Gardener*, 1838.

undignified. "Yet," he observed, making the best of it, "viewing the lawn as an arena for the display of plants, statues, and other interesting objects, from the windows of the drawing-room, it has an advantage in that point of view over a falling surface"—and he proves his opinion, as he always delighted to do, with an elaborate geometrical figure of intersecting triangles and circles.

Even if MRS. LAWRENCE hardly understood LOUDON'S recondite mathematics, they probably pacified her. She had certainly made the most of the ground at her disposal, laying it out in groups of ornamental trees and shrubs, sometimes combined with flowers, sometimes with

rockwork, and with many statues and fountains, and many finely-wrought metal flower-baskets (Text Fig. 3).

Of the statues and vases, LOUDON—who, without knowing it, was something of a social leveller—could not help remarking that "though some of these are of bronze, marble, or stone, yet others, of composition equal in point of taste, though far inferior in pecuniary value, are of AUSTIN'S artificial stone, or of earthenware." If LOUISA LAWRENCE felt a twinge when she read that, still, she was a Fellow of the Horticultural Society, and the main point was the plants. These, rhododendrons, azaleas, roses, and herbaceous perennials, were, beyond substitution in



TEXT FIG. 4—The rustic arch and cupid at the Lawrencian Villa, Drayton Green, from *Loudon's Suburban Gardener*, 1838.

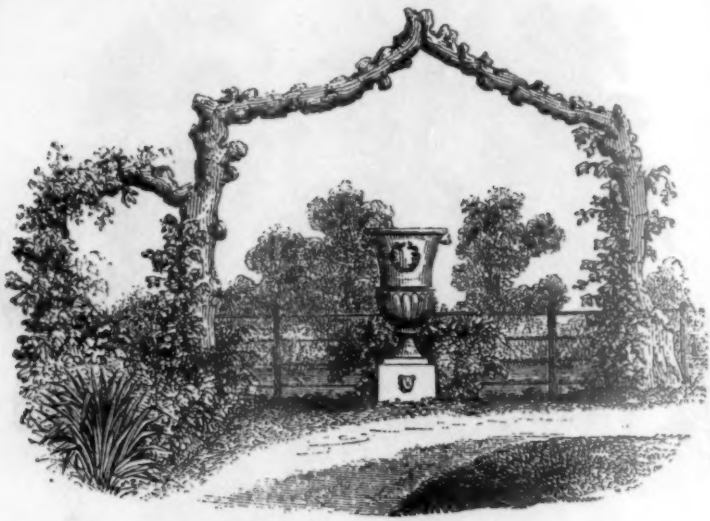
any inferior material, "of the most rare and beautiful kinds"—and again LOUDON knew what he was talking about.

LOUDON regrets that he has not space to name all the rarities that MRS. LAWRENCE grew. But the Lawrencian garden included six hundred species of hardy herbaceous plants, a hundred and forty species of Alpines in the rock-work, and five hundred varieties of roses. This was in days long before the first Hybrid Tea, and before even Hybrid Perpetuals were fashionable; but MR. HENRY BOHN, the publisher, had over a thousand different kinds of rose in his garden at Twickenham.

There were also three hundred and forty varieties of hot-house plants, and it was probably for these, especially her orchids, that MRS. LAWRENCE was famous as the greatest amateur of her time. She was highly competitive. Between May 1833, when she took her first

prize, and May 1838, she had secured a grand total of fifty-three medals. In all England, the only rivals she feared were the great DUKE OF DEVONSHIRE and his astute, ambitious, MR. PAXTON—and, as often as not, she beat them.

Her greatest triumph was the first flowering in captivity of *Amherstia nobilis*, that evergreen leguminous tree "of almost unsurpassed magnificence and brilliancy, requiring a very high and moist temperature." This rare tree flowered in the Lawrencian hot-house soon after its discovery in Burma in 1837. PAXTON flowered it at Chatsworth a year or two later, and then it refused to flower anywhere in England until LORD AMHERST succeeded with it at Didlington Hall in 1887. MRS.



TEXT FIG. 5—Rustic arch and vase at the Lawrencian villa, Drayton Green, from *Loudon's Suburban Gardener*, 1838.

LAWRENCE, having enjoyed her triumph, presented her plant to Kew, where it shortly died.

If the flowering of the noble 'Amherstia' was MRS. LAWRENCE'S greatest horticultural triumph, it was, perhaps, eclipsed socially a few years later when the Queen and the Prince Consort arrived at nine o'clock one evening to see a 'Night-blowing Cereus,' such as THORNTON figured in his 'Temple of Flora,' romantically open its blossom by moonlight or more probably by candle-light.

But this was after 1840, in which year she left Drayton Green, her husband having bought the more socially imposing and professionally impressive Ealing Park. Here, besides QUEEN VICTORIA, she entertained many European Kings and Queens, and countless members of the nobility: and once, SIR ROBERT PEEL and all his Ministers.

Yet Ealing Park, more splendid, can never have been quite the unique success that the villa at Drayton Green had been. For Ealing Park was already well laid out as a garden when she went there; whereas at the Lawrencian villa "all the different scenes, all the beds of flowers, pieces of rockwork, etc., as well as the greenhouses and hot-houses, were designed by MRS. LAWRENCE herself, and executed under her direction."

And this garden of under two acres at Drayton was kept by fewer gardeners than LOUDON had supposed. A mere matter of six men—with the addition of two women for collecting insects and dead leaves—were employed year in year out. And they worked of course, from dawn to dusk, and there were no half-days. There are gardens of almost ten times the acreage that must today make do on a more meagre staff than that. What MRS. LAWRENCE paid out in wages is not known, but from the accounts of an Irish garden in 1838, it would appear that a head gardener got two shillings a day, under-gardeners one-and-fourpence, one-and-twopence, and a shilling, and a boy sixpence.

One does not imagine LOUISA LAWRENCE herself doing much of what JANE LOUDON called "stirring the soil". But surely she knew very well how to look decorative amongst her flowers and bowers and garden ornaments. And she may often have been found alone among them, since LOUDON says that MR. LAWRENCE spent much of his time in London —keeping most of his books and his wine there. LOUDON, perhaps, walked round her garden with never a drink, but was she indeed the "Louisa" of LADY BLESSINGTON'S poem?

> . . . Ay—when he comes,
> (But not till then) I'll smile. O! he has stolen
> My smiles away, and left me, in their stead,
> Tears, bitter tears—unseemly dew for flowers:
> Take back thy gift, then, dear one: it would die,
> Wet by such showers—for Hearts-ease never bloom'd
> On heart from its twin heart by absence reft.

She died in 1855. Her husband lived another twelve years—just long enough to be made SIR WILLIAM LAWRENCE, Baronet, at the age of eighty-four. Her son, SIR TREVOR LAWRENCE, was a reforming President of the Royal Horticultural Society from 1885 till his death in 1913, during which time he restored the society's prestige and more than restored its fortunes.

LOUISA LAWRENCE was only one of a host of contemporary women gardeners. There were also the Scottish LADY DALHOUSIE and the Irish LADY DONERAILE, whose husband, a great hunting man, died of hydrophobia from the bite of a mad fox. There was LADY DOROTHY NEVILL, and there was LADY BROUGHTON. LADY BROUGHTON'S rock-garden at Hoole was modelled on the mountains of Savoy. Some of her towering peaks appear, from contemporary pictures, to have risen well over fifty feet above the paths at their base. They could hardly have been planted

without the help of ladders, and could barely have supported plant life other than *Sedum album* and *Cerastium tomentosum*. The Hoole garden also enshrined an imitation Mer de Glace done in grey limestone, quartz and spar—with fragments of white marble to look like snow. The whole thing must have outshone SIR FRANK CRISP's spectacular efforts of a century later.

Coming down from these heights and from the nobility, there were MRS. WRAY and MRS. SHERBOURNE—once commemorated in what is now an abandoned genus *Sherbournia*. And there was MRS. MARRYATT, F.H.S., whose historic garden at Wimbledon fortunately "fell away in a gradual manner from the front of the house," and who must have gained nearly as many medals as MRS. LAWRENCE herself.

And then there was LADY AMHERST after whom, jointly with her daughter LADY SARA ELIZABETH, the lovely *Amherstia nobilis* was named. She was born in 1762, the HONOURABLE SARA ARCHER, and her first husband was the fifth EARL OF PLYMOUTH—on whose death she married in 1800 the first EARL AMHERST. She died in 1838—shortly before MRS. LAWRENCE managed to make her *Amherstia* flower—and her husband at once married the next dowager LADY PLYMOUTH, his first wife's daughter-in-law. It might be a short story by THOMAS HARDY.

LADY AMHERST was a great patron of botany rather than a great gardener, and her husband's family seems to have been unrelated to that of the LORD AMHERST, who flowered 'Amherstia' in 1887.

This other LORD AMHERST—BARON AMHERST of Hackney—was the father of the HONOURABLE ALICIA MARGARET AMHERST, the fifth of seven daughters, who wrote a learned *History of Gardening in England*—well-documented and reliable down to the end of the seventeenth century, less so, as she herself admitted, in its later chapters.

But ALICIA AMHERST was no contemporary of LOUISA LAWRENCE's. Of those who were her contemporaries, few for certain had a garden that equalled, none a garden that surpassed, the two acres sloping gently upwards from the drawing-room windows at the Lawrencian villa.

NEW PRIMULA FROM NEPAL

F. Ludlow

Primula reidii Duthie var. **williamsii** Ludlow.*

IN 1952 and 1954 the British Museum (Natural History) and The Royal Horticultural Society sponsored expeditions to West and Central Nepal respectively, and on each occasion the collectors returned with a blue Soldanelloid primula of great beauty.

* **Primula reidii** Duthie var. **williamsii** Ludlow, var. nov. Varietas haec habitu robustiore, corolla majore coerulea nec alba a typo (var. *reidii*) recedit; nonnunquam cum *P. wigramiana* W. W. Sm. certe valde affini confusa sed species citata foliis breviter petiolatis aliter dispositis divergit. Typus in Herb. Mus. Brit. a *Stainton, Sykes & Williams* (n. 1770) lectus.

This primula was at first regarded as a new species closely related to *P. wigramiana* W. W. Sm. and *P. wollastonii* Balf. f., but, in 1954, on receipt of additional material it was apparent that its true affinity lay with *P. reidii* Duthie. Indeed, except for its blue flowers and more robust form of growth, it is not possible to separate this plant from *P. reidii* taxonomically. Even the difference in colour shows signs of inconstancy. For example, in *Stainton, Sykes and Williams* 1101, a gathering of blue-flowered plants, there is one which is white save for a blue edging to the margin of the corolla; and in *Polunin, Sykes and Williams* 2563, collected in 1952, which is a white-flowered gathering of *P. reidii*, there are plants which show blue edgings to the corollas. Colour variations from white to blue or *vice versa*, are not infrequent in the section Soldanelloideae—witness *P. buryana* Balf. f. and *P. umbratilis* Balf. f. For the present, therefore, it seems better to regard this lovely Soldanelloid from Nepal not as a new species but as a variety of *P. reidii*. The varietal epithet is in honour of MR. L. H. J. WILLIAMS of the British Museum (Natural History), who was the leader of both expeditions. Seeds and plants in the dormant state were collected by the two expeditions on several occasions and the plant is now being grown with considerable success in many gardens. It was exhibited at the R.H.S. Show on May 25, 1954, but received no commendation (Fig. 92). Altogether twelve gatherings were made, four in Western Nepal in 1952, and eight in Central Nepal in 1954, viz:—

WESTERN NEPAL, 1952. *Polunin, Sykes and Williams* 2260, 3379, 3535, 3578.

CENTRAL NEPAL, 1954. *Stainton, Sykes and Williams* 1028, 1101, 1770, 3245, 4675, 5602, 7941, 9003.

The type specimen is *Stainton, Sykes and Williams* 1770, Taglung (south of Tukucha), Kali Gandaki, 12,000 ft., July 12, 1954, and is preserved in the British Museum (Natural History).

PLANTS AND PROBLEMS—XIX

TREATMENT OF ELMS

Question. Along one end of my estate there is a fine row of common elm. The trees are now reaching maturity and as far as I can tell there is no evidence to suggest that the trees are not sound. Despite the healthy appearance of the planting it has been pointed out to me that elms are dangerous and in the public interest I *must* have them removed. Could you please tell me if elms are always dangerous and advise me on what steps I should take if this is the case?

Answer. Of late years the question of the safety of common elm (*Ulmus campestris*) has been much in the public mind. The matter was considered by the Ministry of Works Advisory Committee on Forestry. This Committee did not believe that mature trees of this elm are to

be regarded as necessarily dangerous. In addition to this the Committee recommended *further* planting of the tree where considerations of environment made it especially suitable.

This does not mean that elms cannot be dangerous and in the interest of public safety confirmation should be made that there is no Dutch Elm disease in the trees. To this it must be added that it is only fair and reasonable to remove any heavy branches which may be the cause of trouble at some future date.

PERPETUAL-FRUITING STRAWBERRIES AND VIRUS

Question. I have recently planted some perpetual fruiting strawberries, variety 'Triomphe,' within 3 feet of some very healthy 'Royal Sovereign.' Since doing so I have read in my nurseryman's catalogue that perpetual-fruiting varieties whilst not necessarily showing virus themselves may act as carriers and should, therefore, be planted away from ordinary summer-fruiting varieties. Would a 9-foot gap be sufficient safeguard as I can arrange this by discarding my oldest 'Royal Sovereign' plants?

Answer. To be reasonably safe against the spread of virus a minimum of 60 feet should separate your perpetual-fruiting variety and 'Royal Sovereign.' One of the great drawbacks with the perpetual-fruiting strawberries is that there are no virus-free stocks of them available. Therefore, unless properly isolated, they can infect healthy stock of our summer-fruiting varieties with disastrous results, particularly virus-sensitive ones like 'Royal Sovereign.' This same isolation system should also be adopted where virus tolerant and virus-sensitive summer-fruiting varieties are being planted in the same garden. The outstanding example of this is where the tolerant 'Huxley Giant' is being planted along with the sensitive 'Royal Sovereign.' Tolerant varieties may carry virus but are not so liable to show symptoms of it as are the sensitive ones.

CAPSID ON APPLE FRUITS

Question. Many of my apples this year have raised, corky blotches on the skin. What is the cause of this and is there anything I can do next year to prevent it happening again?

Answer. The apples have been damaged by the Apple Capsid Bug, *Plesiocoris rugicollis*.

The eggs are laid in midsummer in the bark of young shoots but do not hatch until April or May the following year. The young capsids are yellowish-green in colour. They feed on the foliage causing small brown marks to appear, which afterwards turn black. Later, they puncture the young fruitlets causing similar marks to appear, which as the fruit increases in size develop in corky patches. By June the nymphs mature and the adults remain on the tree for a period of about seven weeks, during which time the

eggs are deposited. The adults are active insects, green in colour and about ¼ inch long.

The pest is controlled by the use of a DDT spray diluted according to maker's instructions and applied at the green cluster stage.

THRIPS ON FREESIAS

Question. Could you please tell us what is attacking our freesias as it is getting quite serious?

Answer. The silvering of the freesia foliage has been caused by the feeding of the Onion Thrips, *Thrips tabaci*, which attacks a wide range of plants outdoors and under glass.

The eggs are inserted into the underside of the leaves or in various parts of the flowers and they hatch about a week later under glasshouse conditions. The yellow larvae feed on the foliage and blooms and when fully fed they enter the soil in order to pupate. The adults which vary in colour from yellow to dark brown emerge shortly afterwards. There are two or three generations a year out of doors, but under glass there may be as many as twelve.

Damaged plants may show silvered foliage, flecked or discoloured flower petals or malformed blooms.

Regular spraying with water helps to reduce the population on infested plants since young larvae have difficulty in returning to the plants once they are dislodged.

Routine spraying with DDT or BHC or periodic fumigation with smoke generators containing these substances will give an effective control.

MICHAELMAS DAISIES

Question. What is the best remedy for mildew on my Michaelmas daisies?

Answer. The common powdery mildew on Michaelmas daisies which shows as a whitish coating on the leaves is caused by the fungus *Erysiphe cichoracearum*. Some varieties are more susceptible than others, but it is worth mentioning that extreme dryness at the roots will make the plants more prone to attack and on light soils some provision for mulching and watering should be considered.

The spray recommended against this mildew is lime sulphur used at the strength of one part in eighty parts of water (i.e. ½ pint in 5 gallons water) with a good spreader added to it. Some people use one of the brands of colloidal copper spray with good results but those asters of Ericoides type will not tolerate copper sprays and should not be included in such a treatment.

NOTES FROM FELLOWS

Camellia reticulata in California

THE nineteen varieties or hybrids of *Camellia reticulata* which were brought from Kunming to California in 1948 and 1949 have now grown sufficiently so that their characteristics may be noted accurately.

It was the opinion of DR. TE TSUN YÜ, former Director of the Yunnan Botanical Institute of Kunming, and DR. WALTER LAMMERTS, who arranged the original shipment to California, that many of these varieties are hybrids. Of the twenty-three garden forms of *C. reticulata* known to exist in China, all but two are of unknown antiquity.

The following varieties have all borne viable seeds in California: 'Buddha,' 'Butterfly Wings,' 'Chang's Temple,' 'Crimson Robe,' 'Lion's Head,' 'Noble Pearl,' 'Tali Queen,' 'Willow Wand.'

Experiments now in progress indicate that all of the varieties named above may be propagated from rooted cuttings. Those not named must be reproduced by grafting. At the Huntington Botanical Gardens, San Marino, California, more than two hundred seeds taken from *C. reticulata*, garden form, have been germinated.

RALPH PEER

Los Angeles.

WISLEY TRIALS, 1954 AND 1955

FREESIAS

Sixteen stocks of seed of freesias were received in 1954 for trial at Wisley. The trial was sown on May 4, 1954 into 8-inch pots containing John Innes Potting Compost No. 1. The pots were stood in a warm glasshouse and when the seedlings were 2 inches high the number of seedlings in each pot was reduced to eight. For the summer the trial was transferred to a cold frame where the pots were plunged in peat. On September 15, 1954 the trial was moved into a warm glasshouse. During September and October a weekly feed of a liquid fertilizer was given.

The trial was inspected by a sub-committee of Floral Committee "A" and on its recommendation the Council of the Royal Horticultural Society has made the following awards to six strains of freesias.

The number in brackets after the description of the variety was that under which it was grown in the trial.

OHLSENS ENKE SUPER WHITE. (Raised, introduced and sent by Messrs. J. E. Ohlsens Enke, Copenhagen, Denmark.) **A.M.** December 2, 1954. Plant 28 inches tall, vigorous; flowers 2¼ inches diameter, 2 inches long, eight to twelve flowers per spike, pure white, throat yellow at extreme base. [1]

HUNDERUP YELLOW. (Raised, introduced and sent by Messrs. L. Daehnfeldt Ltd., Odense, Denmark.) **H.C.** November 18, 1954. Plant 26 inches tall, vigorous; flowers 2⅛ inches diameter, 1¾ inches long, nine to thirteen flowers per spike, Indian Yellow (H.C.C. 6/1), outer edges of petals Indian Yellow (H.C.C. 6). [3]

HUNDERUP RED. (Raised, introduced and sent by Messrs. L. Daehnfeldt Ltd.) **H.C.** November 18, 1954. Plant 30 inches tall, vigorous; flowers $1\frac{3}{4}$ inches diameter, $1\frac{7}{16}$ inches long, colours in shades of red which included China Rose (H.C.C. 024/1), Magenta (H.C.C. 27/2), and Magenta Rose (H.C.C. 027/1), throat white with yellow blotch. [9]

KONYNENBURG & MARK SUPER BLUE. (Raised, introduced and sent by Messrs. Konynenburg & Mark, Noordwyk, Holland.) **H.C.** December 2, 1954. Plant 33 inches tall, vigorous; flowers 2 inches diameter, $1\frac{3}{4}$ inches long, eight to twelve flowers per spike, colours in shades of blue which included Mauvette (H.C.C. 537), Campanula Violet (H.C.C. 37/3), Methyl Violet (H.C.C. 39/2) and Violet (H.C.C. 36/2), throat white at base yellow. [14]

OHLSENS ENKE SUPER LIGHT BLUE. (Raised, introduced and sent by Messrs. J. E. Ohlsens Enke.) **H.C.** December 2, 1954. Plant 30 inches tall, vigorous; flowers $1\frac{3}{4}$ inches diameter, $1\frac{3}{4}$ inches long, six to fifteen flowers per spike, colours in shades of blue which included Aster Violet (H.C.C. 38/3) and Aster Violet (H.C.C. 38/1), throat white. [11]

OHLSENS ENKE SUPER RED. (Raised, introduced and sent by Messrs. J. E. Ohlsens Enke.) **H.C.** December 2, 1954. Plant 30 inches tall, vigorous; flowers $1\frac{3}{4}$ inches diameter, $1\frac{3}{4}$ inches long, eight to sixteen flowers per spike, colours in shades of red near Magenta (H.C.C. 27), throat creamy yellow. [7]

NARCISSI

A sub-committee of the Narcissus and Tulip Committee inspected the trial on April 22, 1955 and on its recommendation the Council of the Royal Horticultural Society has made the following awards to narcissi as varieties for garden decoration.

The number in brackets after the description of the variety was that under which it was grown in the trial. Twenty-five bulbs of each variety were grown.

Division I.—Trumpet Narcissi

(a) Perianth coloured; Corona coloured, not paler than the Perianth

KOREA. (Raised, introduced and sent by Mrs. F. E. W. Hanger, The Royal Horticultural Society's Gardens, Wisley, Ripley, Woking, Surrey.) **A.M.** April 22, 1955. Plant vigorous, foliage 18 inches long, erect. Flower stems 18 inches tall; flowers $4\frac{1}{2}$ inches diameter, of good form; perianth segments $1\frac{1}{2}$ inches long, surface flat to slightly ribbed, Canary Yellow (H.C.C. 2/1); corona $2\frac{1}{8}$ inches long, slightly ribbed, mouth expanded, frilled, margins serrated, reflexed, Aureolin Yellow (H.C.C. 3). Flowering from April 11, 1955. Flowers in the first year twenty-five, in the second sixty-eight. [32]

(c) Perianth white; Corona white, not paler than the Perianth

MOUNT HOOD. (Raised and introduced by Messrs. P. van Deursen, Sassenheim, Holland and sent by Messrs. R. H. Bath Ltd., The Floral Farms, Wisbech, Cambridgeshire.) **F.C.C.** April 22, 1955. Described R.H.S. JOURNAL **76**, p. 279. (**A.M.** 1951.) [4]

Division VI.—Cyclamineus Narcissi

(a) Cup or corona not less than two-thirds the length of the Perianth segments

CHARITY MAY. (Raised, introduced and sent by C. F. Coleman Esq., Broomhill, Hartley, Cranbrook, Kent.) **F.C.C.** April 22, 1955. Described R.H.S. JOURNAL **77**, p. 340. (**A.M.** 1952.) [85]

SCHIZANTHUSES

Twelve stocks of schizanthuses were received in 1954 for trial at Wisley. The trial was sown on August 20, 1954, in seed pans containing John Innes Seed Compost. The plants were potted singly into 3-inch pots on September 24 using John Innes Potting Compost No. 1. Three plants were potted into an 8-inch pot on October 14 and were given a further move into a 10-inch pot on December 2. For these two pottings John Innes Potting Compost No. 2 was used. Ten pots of each strain were grown. During all stages of growth the house was kept as cool as possible; pipe heat was used only to keep out frost. Commencing in February a good feed of liquid manure was given at weekly intervals. The plants were in bloom during March and April.

The trial was inspected by a sub-committee of Floral Committee "A" on March 30, 1955, and on its recommendation the Council of The Royal Horticultural Society has made the following awards to strains of schizanthus.

The number in brackets after the description of the variety was that under which it was grown in the trial.

DR. BADGER'S HYBRIDS. (Sent by Messrs. Watkins & Simpson Ltd., 26-29 Drury Lane, Covent Garden, London, W.C.2.) **A.M.** March 30, 1955. Plant 3½ feet high, 18 inches spread, erect and compact, much branched; leaves 6½ inches long, 3½ inches wide, cut, light green; flower stem stout, rigid; inflorescence 13 inches long, 9 inches across, compact, flowers freely; flowers 2⅜ inches diameter, single, petals broad, cut, wavy; a good range of colours including creamy-pink, rose-pink, cerise, purple, all with yellow eye and darker venations, and cerise with deep plum-purple eye. [7]

MELVILLE CASTLE. (Raised, introduced and sent by Messrs. Dobbie & Co. Ltd., Edinburgh 7.) **H.C.** March 30, 1955. Plant 3½ feet high, 18 inches spread, erect and compact, much branched; leaves 5 inches long, 2½ inches wide, cut, light green; flower stem stout, rigid; inflorescence 10 inches long, 5 inches across, fairly compact, flowers freely; flowers 1⅜ inches diameter, single, petals broad, serrated; a good range of colours including pale lilac, lilac, rosy-pink, magenta, maroon, purple, all with yellow eye and darker venations. [5]

PANSY FLOWERED. (Sent by Messrs. Watkins & Simpson Ltd.) **H.C.** March 30, 1955. Plant up to 3½ feet high, erect and compact, branched; leaves 4 inches across, 2 inches wide, cut, medium green; flower stems stout, rigid; inflorescence 9 inches long, 9 inches across, loose, flowers freely; flowers 1¾ inches diameter, single, petals broad, fringed and cut, a good bright mixture of colours, including pale pink, rose-pink, cerise, magenta, purple and lilac. [10]

QUANTOCKS. (Raised, introduced and sent by M. J. Nicholson Esq., Cala, Kingston St. Mary, Taunton, Somerset.) **H.C.** March 30, 1955. Plant 2½ feet high, erect and very compact, branched; leaves 5 inches long, 2½ inches wide, cut, light dull green; flower stems stout, rigid; inflorescence 5 inches long, 7 inches diameter, compact, flowers freely; flowers 1½ inches diameter, single, petals broad, cut, slightly recurved, Currant Red (H.C.C. 821/1) with white eye and maroon venation, a few plants with yellow eye. [8]

CABBAGES

Twenty-one stocks of cabbages were received for the trial which was confined to 'Christmas Drumhead' and successional varieties. The trial was sown on May 19, 1954 and planted out on July 7. The rows were 2 feet apart

and the plants 1½ foot apart in the rows. The ground on which the trial was planted was double dug during the winter. A base dressing of fertilizer was applied fourteen days before planting; this dressing consisted of 2 ounces per square yard of hoof meal, 1 ounce per square yard of superphosphate and 1 ounce per square yard of sulphate of potash.

The trial was inspected by a sub-committee of the Fruit and Vegetable Committee on October 15 and November 25, 1954 and on its recommendation the Council of the Royal Horticultural Society has made the following awards to cabbages.

The number in brackets after the description of the variety was that under which it was grown in the trial.

CHRISTMAS DRUMHEAD SELECT. (Raised, introduced and sent by Messrs. Elsoms (Spalding) Ltd., Elsom House, Spalding, Lincs.) **A.M.** October 15, 1954. Plant 10 inches high, 19 inches across, compact, medium grey-green; head 8 inches diameter, 6 inches long, drumhead, solid, 84 per cent. fit to cut on October 16. [8]

JANUARY KING. (Sent by Messrs. D. T. Brown & Co. Ltd., Poulton le Fylde, Lancs.) **A.M.** November 25, 1954. Plant 14 inches high, 12 inches across, compact, medium grey-green; head 9½ inches diameter, 6 inches long, drumhead, solid, 68 per cent. fit to cut on November 29. [19]

CHRISTMAS DRUMHEAD EARLY SELECTED. (Sent by Messrs. W. Deal & Sons Ltd., Kelvedon, Essex.) **H.C.** October 15, 1954 as an early stock. Plant 11 inches high, 24 inches across, compact, medium grey-green; head 8 inches diameter, 6 inches long, drumhead, 89 per cent. fit to cut on October 16. [6]

CHRISTMAS DRUMHEAD SELECTED. (Sent by Messrs. J. L. Clucas Ltd., Ormskirk, Lancs.) **H.C.** October 15, 1954 as an early stock. Plant 10 inches high, 23 inches across, compact, medium grey-green; head 7½ inches diameter, 5 inches long, drumhead, 71 per cent. fit to cut on October 16. [10]

JANUARY KING. (Raised, introduced and sent by Messrs. Sutton & Sons Ltd., Reading, Berks.) **H.C.** November 25, 1954. Plant 13 inches high, 22 inches across, compact, medium grey-green; head 7 inches diameter, 6 inches long, drumhead, 50 per cent. fit to cut on November 29. [23]

SAVOYS

Forty-one stocks of savoys were received for the trial which was confined to varieties maturing not earlier than 'Best of All.' The trial was sown on May 19, 1954 and planted out on July 7. The rows were 2 feet apart and the plants 1¾ foot apart in the rows. The ground on which the trial was planted was double dug during the winter. A base dressing of fertilizer was applied fourteen days before planting; this dressing consisted of 2 ounces per square yard of hoof meal, 1 ounce per square yard of superphosphate and 1 ounce per square yard of sulphate of potash.

The trial was inspected by a sub-committee of the Fruit and Vegetable Committee on October 15 and November 25, 1954 and on its recommendation the Council of the Royal Horticultural Society has made the following awards to savoys.

The number in brackets after the description of the variety was that under which it was grown in the trial.

APRIL MARKET. (Raised, introduced and sent by Messrs. Harrison & Sons (Leicester) Ltd., Leicester.) **A.M.** November 25, 1954. Plant 18 inches high, 24 inches across, compact, medium grey-green; head 7½ inches diameter, 6 inches long, drumhead, solid, 70 per cent. fit to cut on November 29. [22]

AUBERVILLIERS IMPROVED. (Raised, introduced and sent by Messrs. J. E. Ohlsens Enke, Copenhagen, Denmark.) **A.M.** October 15, 1954. Plant 9½ inches high, 16 inches across, compact, bright medium-green; head 8 inches diameter, 6½ inches long, drumhead, solid, 89 per cent. fit to cut on October 16. [7]

CLUSEED ORMSKIRK LATE GREEN. (Raised by Mr. A. A. Clucas, introduced and sent by Messrs. J. L. Clucas Ltd., Ormskirk, Lancs.) **A.M.** November 25, 1954. Plant 18 inches high, 24 inches across, compact, dark grey-green; head 6 inches diameter, 5 inches long, drumhead, solid, 58 per cent. fit to cut on November 29. [18]

KING OF WINTER IMPROVED. (Raised, introduced and sent by Messrs. C. Beemsterboer Pty Ltd., Warmenhuizen, Holland.) **A.M.** November 25, 1954. Plant 12 inches high, 24 inches across, compact, dull medium grey-green; head 6 inches diameter, 5 inches long, drumhead, solid, 66 per cent. fit to cut on November 29. [30]

ALEXANDER'S LATE IMPROVED. (Raised and introduced by Mr. W. Alexander, Home Farm, Eynsford, Kent, and sent by Messrs. W. Deal & Sons Ltd., Kelvedon, Essex.) **H.C.** November 25, 1954. Plant 17 inches high, 20 inches across, very compact, medium grey-green; head 6 inches diameter, 5½ inches long, drumhead, solid, 78 per cent. fit to cut on November 29. [26]

BEST OF ALL SELECTED. (Raised, introduced and sent by Messrs. Watkins & Simpson Ltd., 27–29 Drury Lane, Covent Garden, London, W.C.2.) **H.C.** October 15, 1954. Plant 10 inches high, 18 inches across, compact, light green; head 6½ inches diameter, 7 inches long, drumhead, solid, 83 per cent. fit to cut on October 16. [4]

CLUSEED ORMSKIRK EXTRA LATE. (Raised by Mr. A. A. Clucas, introduced and sent by Messrs. J. L. Clucas Ltd.) **H.C.** November 25, 1954. Plant 14 inches high, 20 inches across, compact, medium grey-green; head 6 inches diameter, 5½ inches long, drumhead, solid, 87 per cent. fit to cut on November 29. [23]

KING. (Raised, introduced and sent by Messrs. L. Clause S.A., Bretigny-sur-Orge (Seine et Oise), France.) **H.C.** October 15, 1954. Plant 10½ inches high, 24 inches across, compact, grey-green; head 7 inches diameter, 6½ inches long, drumhead, solid, 93 per cent. fit to cut on October 16. [10]

ORIGINAL NOVUM. (Raised and sent by Messrs. Jacob Jong Seed Co., Noordscharwoude, Holland.) **H.C.** October 15, 1954. Plant 9 inches high, 20 inches across, compact, dark green; head 6 inches diameter, 6½ inches long, drumhead, solid, 96 per cent. fit to cut on October 16. [16]

SLUSIA NOVELTY. (Raised, introduced and sent by Messrs. A. Sluis Ltd., Enkhuizen, Holland.) **H.C.** October 15, 1954. Plant 9 inches high, 20 inches across, compact, dark green; head 5 inches diameter, 6 inches long, drumhead, solid, 100 per cent. fit to cut on October 16. [29]

SLUSIA PEARL. (Raised, introduced and sent by Messrs. A. Sluis.) **H.C.** November 25, 1954. Plant 18 inches high, 24 inches across, compact, medium dull grey-green; head 8 inches diameter, 7 inches long, drumhead, 90 per cent. fit to cut on November 29. [35]

TOFFEN. (Introduced and sent by Messrs. G. R. Vatter Ltd., Bern, Switzerland.) **H.C.** November 25, 1954. Plant 10½ inches high, 20 inches across, compact, very dark dull greyish-green; head 5 inches diameter, 5½ inches long, drumhead, solid, 85 per cent. fit to cut on November 29. [27]

VERTUS IMPROVED. (Raised, introduced and sent by Messrs. J. E. Ohlsens Enke.) **H.C.** October 15, 1954. Plant 12 inches high, 24 inches across, compact, medium green; head 7½ inches diameter, 6 inches long, drumhead, solid, 82 per cent. fit to cut on October 16. [8]

WINTERFÜRST IMPROVED. (Raised, introduced and sent by Messrs. J. E. Ohlsens Enke.) **H.C.** November 25, 1954. Plant 12 inches high, 24 inches across, compact, dark grey-green; head 7 inches diameter, 5 inches long, drumhead, solid, 65 per cent. fit to cut on November 29. [13]

WINTER KING. (Introduced and sent by Messrs. Jacob Jong Seed Co.) **H.C.** November 25, 1954. Plant 16 inches high, 24 inches across, compact, dull grey medium green; head 6½ inches diameter, 6 inches long, drumhead, solid, 86 per cent. fit to cut on November 29. [31]

PLANTS TO WHICH AWARDS HAVE BEEN MADE IN 1955

Narcissus 'Corncrake' A.M. May 24, 1955. As a variety for exhibition. A well-formed bicolor small-cupped Narcissus (Division 3b) with a flower 3⅝ inches in diameter, borne on a 21-inch stem. The white perianth segments, which were of good substance, were smooth, broad and overlapping, the outer ones being 1⅝ inches long and 1¾ inches broad. The Saturn Red (H.C.C. 13/1), saucer-shaped corona was $\frac{5}{16}$ inch long, 1⅛ inches in diameter, pleated, and frilled at the margin. Raised and shown by Mr. Guy L. Wilson.

Narcissus 'Fairy Tale' A.M. May 3, 1955, as a variety for exhibition. A neat bicolor small-cupped Narcissus (Division 3b) with a flower about 3½ inches in diameter, borne on a 19-inch stem. The white perianth segments were broad, rounded and overlapping, the outer ones being 1½ inches long and about as much across. The bowl-shaped corona, which was $\frac{7}{16}$ inch deep and about $1\frac{1}{16}$ inches across at its indented margin, was creamy-white with a well-marked Marigold Orange (H.C.C. 11/1) rim. Raised and shown by Mr. Guy L. Wilson, The Knockan, Broughshane, Ballymena, Northern Ireland.

Narcissus 'Gay Time' A.M. May 3, 1955. As a variety for exhibition. A bicolor double variety (Division 4) with a flower 4¼ inches in diameter, borne on a stout 19-inch stem. The creamy-white segments were interspersed with Saturn Red (H.C.C. 13) remnants of the corona. Raised and shown by Mr. J. L. Richardson.

Narcissus 'Raindrop' A.M. April 5, 1955. As a variety for cultivation in pots or pans. A charming little white *triandrus* hybrid (Division 5b) with flowers up to about $1\frac{3}{16}$ inches in diameter, borne in threes on 5½-inch stems. The overlapping apiculate perianth segments were about ½ inch long and ⅜ inch across, becoming fully reflexed. The cup-shaped

corona was about $\frac{5}{16}$ inch long and about $\frac{1}{2}$ inch in diameter. Raised and shown by Mr. Alec Gray, Camborne, Cornwall.

Narcissus 'Rose Caprice' A.M. May 3, 1955. As a variety for exhibition. A refined bicolor large-cupped Narcissus (Division 2b) with a flower 4 inches in diameter, borne on a stout 18-inch stem. The white perianth segments were broad, rounded and overlapping, the outer ones being $1\frac{7}{8}$ inches long and about as much across. The trumpet-shaped corona, which was $1\frac{1}{2}$ inches long and 2 inches in diameter at its reflexed and frilled margin was Pale Apricot (H.C.C. 609/3) within but paler without. Raised and shown by Mr. J. L. Richardson, Prospect House, Waterford, Eire.

Tulip 'Leica' A.M. May 24, 1955. As a variety for garden decoration. A lily-flowered variety (Division 6) with a creamy-white flower, with outer segments about $4\frac{1}{4}$ inches long, somewhat reflexed and having a slight twist. The base was unstained and the pollen yellow. Raised and shown by Messrs. P. Bakker Mzn., Ltd., Enkhuizen, Holland.

Tulip 'Sweet Harmony' A.M. May 24, 1955. As a variety for garden decoration. A Darwin variety (Division 9) with a strong stem. The segments were about $3\frac{3}{4}$ inches long Barium Yellow (H.C.C. 503) passing to white at the margins. The unmarked base and pollen were Barium Yellow. A sport from 'Mrs. Grullemans,' first recorded by Mr. J. B. Roozen. Shown by Messrs. P. de Jager & Sons (London) Ltd., Windsor House, Victoria Street, London, S.W.1.

ORCHIDS

Cymbidium (Miretta G.) 'Exbury' A.M. April 5, 1955. This is another cultivar of the green-flowered *C.* 'Miretta Grex' to receive an award. The parentage is *C.* (Claudette G.) 'Invicta' × *C.* 'Mirabel'. A spike bearing eight flowers, each $4\frac{1}{2}$ inches by 4 inches was exhibited. The undulating tepals are pale green with the dorsal incurved. The white labellum has a dull reddish band near the lower margin, but a very narrow band of white extends round the apex. The crest is creamy yellow and the column possesses a tinge of pink. Exhibited by E. de Rothschild, Esq., Exbury, Southampton.

Cymbidium (Royal Duke G.) 'Majestic' F.C.C. April 5, 1955. *C.* (Pearl G.) 'Magnificum' and *C.* (Rosanna G.) 'Pinkie', are the parents of this plant, which must be one of the largest flowered cymbidiums in existence. A very large spike bearing thirteen flowers was exhibited, individual flowers being over 4 inches in length and width. The tepals are somewhat incurved and the basic colour is cream, upon which a pink flush showing through from the reverse can be observed. The labellum is suffused with pale pink and in addition bears dark red blotches with a dark streak down the centre. The column is reddish. Exhibited by Messrs. Clint McDade & Sons, 1012 James Boulevard, Signal Mountain, Tennessee, U.S.A.

Cymbidium (Carillon G.) 'Pink Charm' A.M. April 5, 1955. *C.* (Babylon G.) 'Castle Hill' and *C.* (Carisbrooke G.) 'Brilliance' are the

parents of this cultivar. A spike of six flowers, each being 3½ inches by 3½ inches was exhibited. The deep pink tepals have darker fenestrations, while the labellum is basically cream flecked with dark red spots, especially towards the margin. The double crest is deep yellow. Exhibited by Lt.-Col. The Lord Hothfield, Castle Hill, Englefield Green.

BOOK NOTES

"Alpine Gardening." By Lawrence D. Hills. 349 pp. illus. (Faber & Faber, 1955.) 25*s*.

When one sees a new and expensive book on the well-worn subject of rock or alpine gardening one must ask: is this publication really necessary?

The preface suggests that the book is for beginners who are owners of small gardens for whom rock gardening is a very suitable pursuit but I suggest that the owner of the "most cat and soot infested town garden on the worst and coldest soil" would be wiser to spend his money on other activities.

Apart from those unfortunates, the book should prove useful to the owners of small gardens for showing, once again, that rock plants can be grown without rocks in bank or border. The chapters on these are sound as also those on the small rock garden and rock wall but I question the wisdom of suggesting for the latter those terrible weeds *Campanula poscharskyana* and *Corydalis lutea* and for any position *Linaria hepaticifolia* and *L. aequitriloba*.

The alpine path or rather pavement as suggested is of doubtful value to the beginner although it can be of use for growing many plants both easy and difficult if not walked upon. Again all the alpine lawns I have seen have ended up with Thymes and Acaenas as the predominant vegetation, charming, no doubt, but taking up too much space in the small garden. It is curious that the simple and cheap system of growing all rock plants excepting the rampers in some form of scree is not referred to.

The style is rather discursive and in some places the result is unintelligible, e.g. p. 177, under *Convolvulus althaeoides*, and p. 187, Propagation. On the other hand, it has an advantage for beginners who might be frightened by the "high brow" appearance of a dictionary.

One cannot cavil at most of the plants recommended but I doubt whether *Gentiana hexaphylla* is a plant for the novice who will also be disappointed with *Sternbergia lutea* unless he obtains forma *angustifolia*. I am also surprised that MR. HILLS recommends *Lithospermum graminifolium* so often as the true plant is distinctly rare, and also his statement that hardy cyclamen seeds are black. The chapters on soils and propagation are sound but fuel peat blocks should be avoided at all cost.

There are a few spelling mistakes and many of the photographs are poor and surely No. II is not *Narcissus bulbocodium* as stated, but the line drawings are excellent. The glossary should appeal to all those who wish to take an intelligent interest in their hobby.

The book itself is nicely produced and packed with information and even if not "really necessary" will be of value to those for whom it is intended if read critically.

E. B. ANDERSON

"Miniature Daffodils." By Alec Gray. 57 pp. Illus. (W. H. & L. Collingridge Ltd.) 15*s*.

Quite a large amount of information about the smaller species of Narcissus has already been published, especially from the botanical angle, but the smaller narcissi in general, both species and hybrids, have not hitherto been dealt with in a popular way in one volume. This slim volume sets out to do this, as fully as is possible within a small compass. Mr. Alec Gray is so well known as an expert on these miniatures that his advice on culture, both indoor and outside, should help many to grow them successfully. The chapters on hybridizing and seed sowing are not only an introduction to a fascinating side of daffodil growing and the advice is applicable not only to the miniatures but also to the large hybrids, but for some of the species it is almost essential to renew them occasionally by sowing seed. There is a very wide field for the production of

miniature hybrids and, as this is too vast for one man, Mr. Gray gives clear and specific instructions how to do it. Lists of species and hybrids to grow are given under the five main heads of Trumpets, Triandrus, Cyclamineus, Jonquils and Poeticus, which simplifies the difficulty some may have in choosing varieties and as Mr. Gray says, not only are their virtues mentioned but also their faults if they have them. He has also provided other lists of varieties for naturalizing in grass, but some of them, though eminently suitable for the purpose, cannot be classed as miniatures, neither can some of those recommended for growing in bowls in fibre; even window boxes are catered for and here, except for about four varieties, the selection is a good one. There are eight pages of photographs most of which have two illustrations on each; these give a good idea of the different characteristics of the various types.

C. F. COLEMAN

"Agriculture—A New Approach." By P. H. Hainsworth. 248 pp. Illus. (Faber & Faber 1954.) *21s.*

This book sets out to give a reasoned justification of organic farming based on the best scientific evidence that the author can find. The book can be read in at least three ways: as an account of the methods of organic farming that have been used in this country, as an account of the case for organic farming, and as a critical and impartial discussion of the relative advantages of organic farming methods over those of good present-day practices. On the whole the book comes out well when judged on each of these three ways. It is eminently readable, sanely and clearly written without any extravagant claims being made, and gives a reasonably accurate account of our present knowledge of soils, in so far as it concerns the subjects he is discussing. Thus the account of the methods of organic farming contains a good and adequate description of the making of compost, the different seed mixtures used in leys, and the cultivation of the soil. These chapters contain references to the experiences of the author himself, who is a market gardener practising these methods.

It is naturally somewhat difficult for the reviewer, who has spent his life in scientific research laboratories, to take a completely impartial and detached view of the limitations of outlook he and his colleagues can be accused of possessing. Yet in reading this book there are few places where the reviewer can say the author is either wrong or misleading and in most of these few the points of disagreement are minor, although he is not always in agreement with the emphasis put on some of the points. This means that the author has put forward a well reasoned case for improving British agriculture by placing more reliance on developing the practice of organic farming rather than the increased use of fertilizers.

As a note to those who have purchased the book a little time back, the publishers have announced that they will supply on request a new page to replace pp. 31–32, which by an oversight contained a misprint affecting the argument on those two pages.

E. W. RUSSELL

"Handbooks for the Identification of British Insects" (Royal Entomological Society of London). Vol. X, Part 4 (a). "Diptera Cyclorrhapha. Calyptrata (1). Section (a) Tachinidae and Calliphoridae." By F. I. van Emden. 133 pp. Illus. 20*s.*

This is the latest handbook to be published by the Royal Entomological Society in continuation of their policy to provide illustrated keys to all the British insects; it supplements two handbooks already published on the Order Diptera (True Flies). However, this is the first one to deal with some of the more highly specialized flies. As with previous publications a specialist entomologist has made the contribution. The keys are easy to follow and are well illustrated by line drawings, the majority of which are the work of the author.

V. W. FOWLER

"Trees in Town." By R. J. Morling. With Chapters by John T. Plume and D. V. Wells and a Foreword by B. J. Collins. Med. 8vo. 79 pp. Illus. (Estate Gazette Ltd.) 7*s.* 6*d.*

The book begins with some instruction in elementary botany, and then goes on to give advice about the risk of damage to foundations and buildings by the roots of trees such as poplars, if planted too near, more especially on clay soil. This is an important subject and is very well stated.

There is a chapter on atmospheric pollution and soil contamination resulting in the destruction of beneficial organisms, rendering the soil infertile.

There is one small error, in which the Manchester Poplar is given the name of *Populus Wilsonii*. It should be *P. nigra betulaefolia*. Wilson's Poplar, as we would expect, is Chinese, and has glabrous shoots, whereas the Manchester Poplar has downy new growth.

A good account is given of the powers of Local Authorities under the Tree Preservation Order in the Town and Country Planning Acts of 1943 and 1947. The intention of these Acts was excellent, but in practice too often the power is in the hands of those with inadequate knowledge of arboriculture, as the author points out. Much of the subject-matter applies to country districts and not to towns which is the subject under discussion.

Some advice on the legal aspects both for individuals and public bodies is very well given.

In the chapter on trees and highways detailed advice is given on planting, staking and pruning, not to mention mutilation, and he particularly stresses the employment of skilled men to carry out this work. The operative word is "skilled" and such are difficult to find. Because a man has pruned trees for 35 to 40 years it does not follow he is skilled. He may be, and often is, just as ignorant of the elements of pruning at the end of that time as he was at the beginning. The importance of maintaining a single leader in larger trees is not enough stressed.

Chapter 8 gives some comprehensive and excellent lists of trees and shrubs suitable for various conditions. This will be found the most useful chapter in the book.

W. S. FOX

"A Handbook of British Flowering Plants." Edited by Dr. A. Melderis and E. B. Bangerter. 359 pp. Illus. (Ward Lock & Co. Ltd.) 63*s*.

This book seems to occupy a midway position between a scientific flora and a popular work. The letterpress is all most carefully done as one would expect from such distinguished editors and there are interesting references to the medicinal uses of different plants and explanations of their Latin names. Otherwise the emphasis seems to be on English names which is perhaps less confusing than the many strange aliases under which plants familiar to those brought up on Bentham and Hooker now appear. Occasionally this leads to the absurdity of the English name used being the superseded Latin name while some new and strange Latin name appears.

There is a most useful untechnical key to the families at the beginning of the book with some really excellent drawings of the floral and foliar parts together with a glossary of the few botanical terms that appear in the book. On the other hand, the amateur having found the family of the plant he is looking up must then search through a number of descriptions with but little hope of identifying his plant more closely because there are no keys provided to the genera or to the species.

There are twenty-four plates in colour each containing some ten different plants. These are strongly reminiscent of the excellent figures appearing in Mrs. Perrin's large work on British Flowering Plants, but in at least one case the numbers on the plate do not coincide with the numbers underneath so that the amateur is gravely informed that a poplar is a beech, that a yew is a juniper and that a box is a yew.

Generally a useful book packed with interesting information of the sort that the amateur wants but not very easy for the identification of unfamiliar plants.

L. PALMER

"Flower Arrangement on a Small Income." By Violet Stevenson. 128 pp. Illus. (Hutchinsons, London.) 2*s*. 6*d*.

This excellent book, adequately indexed, deals firstly with the choice of flowers and containers and making an arrangement, followed by twelve chapters suggesting flowers, foliage, etc., which are available each month, including those from the garden, countryside and florist. Its illustrations include 17 good photographs of seasonal flower arrangements, for the most part refreshingly graceful, and many line drawings in the text.

The needs of both those with and without gardens are studied, and gardener/flower arrangers will welcome many suggestions for plants and shrubs to grow and note with approval hints such as those for the correct way of cutting tulips and roses, and for retarding cut tulips and paeonies in a cool cellar.

The book contains many good ideas for colour schemes and for the use of natural material to eke out flowers, and is unreservedly recommended for both novices and experts who may find much that is new in it.

At its low price the book is excellent value, but I would willingly pay more for it in stiff covers and printed on better paper.

JOHN B. NICHOLLS

"Russian Comfrey Report No. 1." By Lawrence D. Hills. 36 pp. Illus. (The Henry Doubleday Research Association.) 3*s*.

The report of the 1954 research results will be of interest to all growers of this valuable fodder crop as it provides an excellent means of evaluating the economic potentialities of Russian comfrey.

"Proceedings of the Scarborough Conference of the National Smoke Abatement Society." 114 pp. Illus. (National Smoke Abatement Society.) 7*s*. 6*d*.

The proceedings of the 21st annual conference are of particular interest to horticulturists because of the Des Voeux Memorial Lecture on "Air Pollution and Plant Life," by Sir Edward Salisbury, Director of the Royal Botanic Gardens, Kew.

"Rock Gardens. How to Plan and Plant Them." By A. Edwards 256 pp. Illus. in colour. (Ward, Lock & Co. Ltd.) 30*s*.

The fourth revised edition brings up to date Mr. Edward's book which first appeared in 1929. It is a comprehensive work, including the treatment of wall, paved and water-gardens with details of construction and planting. There are numerous lists of plants for special purposes and the illustrations include both half-tone and colour, the latter of varying quality.

"Potato Diseases." By Dr. R. McKay. 126 pp. Illus. (Irish Potato Marketing Company, Ltd.) (At the Sign of the Three Candles.) 21*s*.

Dr. McKay has given us a valuable collection of information on potato diseases, especially useful in its concise form for easy reference and for study of the life history, symptoms and control measures of the various diseases affecting the crop. The matter is divided into six groups and is of inestimable value to all interested in the crop, whether gardeners, seedsmen or commercial growers, or those making a special study of a particular subject. In fact, it can be easily understood by all concerned with production of potatoes.

It is a model of the clear and practical way in which diseases affecting a certain crop can be described, and he looks from the laboratory to the land, fostering the realities of agricultural science as affecting the potato. It gives one a realization that the control of plant diseases is of major importance, and leads to the consideration of many facts whose full significance could not be seen earlier.

The excellent illustrations are most helpful in supporting the diagnosis of the bacterial, fungi, virus and non-parasitic diseases mentioned, enabling even an amateur to identify most of the troubles with a reasonable degree of certainty from an examination of the malady seen by the naked eye or with an ordinary pocket lens.

Dr. McKay is one of Ireland's leading agricultural scientists and was amongst those connected with the pioneer work on virus diseases and no greater tribute could be paid to the late Dr. W. D. Davidson (an Irish co-worker), whose aim was directed to the production of pure stocks of healthy plants of all the commercial varieties, than this book of 126 pages. It is not only the outcome of Dr. McKay's own research but constitutes a summary of the discoveries made by early workers and his colleagues in recent years, and much of it presents an extension of science and the application of research in the light of up-to-date knowledge.

N. MCDERMOTT

"British Poisonous Plants." Bull. No. 161 of the Ministry of Agriculture and Fisheries). By A. A. Forsyth. pp. 116 + vi. Illus. (H.M.S.O.) 6*s*. 6*d*.

This fascinating publication will interest farmers and the general gardening public alike, for it is filled with information about a great number of poisonous plants, giving descriptions and listing both their poisonous properties and the antidotes for them. The number of these plants is so formidable and many of them are so familiar that I rather wonder why I survived my childhood, and now in our London garden over twenty of the poisonous plants listed grow, many of them in quantity. Mr. Forsyth has devoted a great deal of research to the problems he sets forth and the result is a well written competent book of real usefulness and interest. It is well illustrated in half-tone with four plates in colour as a frontispiece.

LANNING ROPER

"Plant Propagation." By R. C. M. Wright. 192 pp. Illus. (Ward, Lock & Co. Ltd.) 25*s*.

The contents of this book are well arranged and cover enough of the theory of plant propagation to help the reader to understand thoroughly the majority of the principles involved. It is designed to inform the reader on the propagation of plants of all types—from alpines to vegetables—from fruit and roses to aquatics—together with orchids, mushrooms, etc.

To do all this thoroughly would need several volumes and it is to the author's credit that he has been so concise, enabling him to include such a wide range of subjects. A pleasing feature of the book is the inclusion of various modern techniques such as new insecticides, air layering and his observations on the uses and limitations of root-growth substances.

The proof-reading left a little to be desired, as we find mispellings in 'Daphne Gewka' and 'Nigilla.' 'Ramonda' is correctly spelt in one place and as 'Ramondia' in another. As the preface says, this book is written in simple language as a guide to the amateur grower. This I can endorse by saying that not only will the amateur find much of interest to him or her but also much help can be obtained from the book by the more experienced nurseryman and the student.

Numerous pages illustrating various gardening practices are quite good, making the book well worth the 25*s*. for any person interested in the propagation of plants.

F. E. W. HANGER

"Weed Control in Farm and Garden." By S. J. Willis, B.Sc. 8vo. 170 pp., plus index, with illustrations and 13 text figures (Vinton & Company Ltd., London.) 1954. 8*s*. 6*d*.

This little book has been written primarily for students at Farm Institutes; these young readers with but a short experience of agriculture and horticulture are there also to learn to recognize the common weeds and to name them. Such students most infrequently have any knowledge of organic chemistry, certainly not sufficient for them to appreciate the chemical names or formulae of the so-called hormone weedkillers, which are here confined to an appendix. The author has taken into account such considerations, for he writes simply and directly and offers clearly expressed elementary explanations, and diagrams of common weeds. Due attention is paid to cultural methods of weed control or eradication. Yet it must remain very doubtful if most of the readers will clearly understand the sections introducing the growth regulators; perhaps an illustrated account of the effect of one such substance applied at various rates to one named weed would have proved a more effective introduction, by example, than part of chapter V.

The section dealing with weed control in horticultural crops is unfortunately very brief—but in five pages weed control is outlined in the following vegetable crops—carrots, parsnips, onions, asparagus and peas; bulbs, strawberries and orchards receive the briefest of mention. But gardeners will find other information interesting for them scattered throughout the chapters, for example, concerning non-selective weedkillers, moss in lawns and its eradication, fairy rings in lawns and their control, the mechanical application of weedkillers and methods recommended for the control of ground elder or bishopweed.

M. A. H. TINCKER

"Practical Gardening for Amateurs." By A. G. L. Hellyer. 4th ed., revised. 298 pp. Illus. (W. H. & L. Collingridge Ltd.) 15*s*.

This fourth revised edition should enjoy the same popularity as have the previous ones for Mr. Hellyer's book is more than adequate in its general coverage of the everyday problems of the small garden including flowers, fruits, vegetables, lawns, trees and shrubs. It is practical in its approach and boasts a large number of well-placed line drawings showing procedures and augmenting the text in a most helpful way. Would that the same could be said for the numerous excellent photographs but unfortunately they are scattered through the book with no cross references to the text. Even figure numbers in the latter would have added immeasurably to their usefulness. But this is a minor fault which can easily be put right in the next edition.

LANNING ROPER

"Carnations, Pinks and all Dianthus." By Montagu C. Allwood, F.L.S., V.M.H. 4th ed. 354 pp. Illus. 3 colour plates. (Allwood Bros. Ltd.) 27*s.* 6*d.*

When Mr. Allwood's first edition of this authoritative volume appeared in 1926, it filled a real need for a comprehensive book on this interesting and beautiful family. Now it has been revised to include the significant developments of the years between. It is more than an account of carnations and dianthus for it is as well an exciting insight into the contribution of Montagu Allwood and his colleagues. Allwood is a familiar name to carnation growers throughout the world today, for the export of carnations has become an important business. The cultural directions are concise and practical and the descriptive passages will do much to encourage a wider cultivation of many of the various dianthus.

LANNING ROPER

The following books have been received:

"Classified List of Dahlias." 5th Edition. 1955. 46 pp. (National Dahlia Society, 93 Byng Road, Barnet, Herts.) 1*s.* 6*d.*

"How to Grow Cacti and Succulents." By E. Shurly. 44 pp. Illus. (Cactus and Succulent Society of Great Britain, 7 Deacons Hill Road, Elstree, Herts.) 1*s.*

"Better Pruning of Fruit." By Norman Stewart. 64 pp. (Phoenix House Ltd.) 5*s.*

"Neale's 24 Photographic Reference Plates (Cacti & Succulents) for 1954." (W. T. Neale & Co., Worthing, Sussex.) 20*s.* per annum.

"The Observer's Book of Mosses and Liverworts." By Arthur L. Jewell. 128 pp. Illus. (Frederick Warne & Co. Ltd.) 5*s.*

"1955 Register of Hardy Border Carnations." By Eileen L. Galbally. 28 pp. (J & E. Galbally, Ripston, Ashford, Middlesex.) 2*s.* 6*d.*

"Geranium Growing." By H. G. Witham Fogg. 96 pp. Illus. (W. & G. Foyle Ltd.) 2*s.* 6*d.*

"The Flowering of your Cacti." By E. Lamb. 80 pp. Illus. (Blandford Press.) 6*s.*

"The John Innes High Rate Soil Steriliser." 10 pp. (Oliver & Boyd Ltd.) 1*s.*

"The Dahlia Year Book." 126 pp. Illus. (H. F. Newsom, 93 Byng Road, Barnet, Herts.) 7*s.* 6*d.*

"The Shell Guide to Flowers of the Countryside." Described by Geoffrey Grigson, illustrated by Edith and Rowland Hilder. 46 pp. Illus. (Phoenix House Ltd.) 6*s.* 6*d.*

"Mes Dessin de Jardin" and "Mes Arbustes d'Ornament." From the series "Mes Amies les Fleurs." 32 pp. Illus. (La maison Rustique—Libraire Agricole, Horticole, Forestière et Ménagère.) 160 French francs each.

"Dahlia Growing." By T. R. H. Lebar. 70 pp. Illus (W. & G. Foyle Ltd.) 2*s.* 6*d.*

"The Sweet Pea Annual 1955." Edited by F. Burfoot. 100 pp. Illus. (The National Sweet Pea Society.) 5*s.* to non-members.

"Rotations." Ministry of Agriculture and Fisheries Bulletin 85. By H. G. Sanders. 22 pp. (H.M.S.O.) 1*s.* 6*d.*

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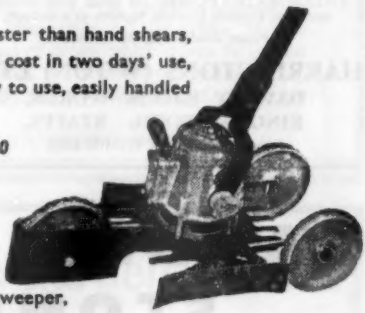

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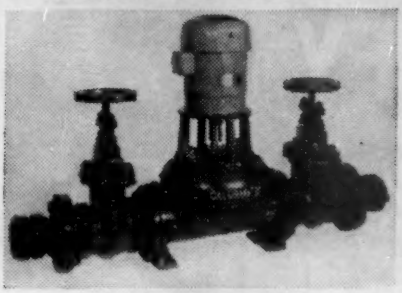

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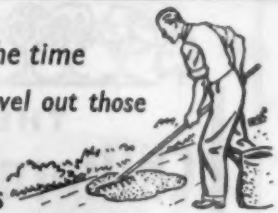

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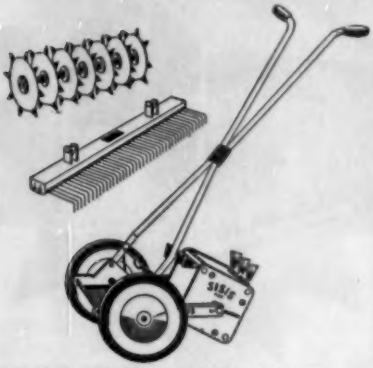

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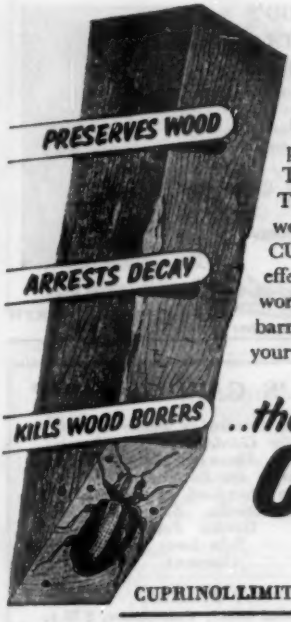

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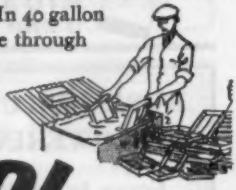

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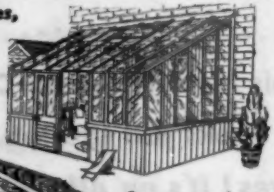

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FRUIT

This new volume, to be published in October, dedicated to Professor Thomas P. Barker of the Long Ashton Research Station, contains authoritative articles on Blenheim apples by Dr. Robb Smith, on bud sports by H. Gavin Brown and on shaping and pruning systems for bush apples by A. P. Preston. J. H. Walker and Gwendoline A. Couch contribute a well illustrated article on the pruning of fan-trained peach trees while G. H. L. Dicker and A. H. M. Kirby of the East Malling Research Station recount their impressions of apple orchard practices in Canada. P. Rowe Dutton reviews some recent fruit literature and Sir Stephen Tallents writes amusingly of the Sir Isaac Newton apple. L. F. Clift's article on fruit growing in the west Midlands is of interest and A. Taylor and M. G. Ridpath enumerate the problems of bird damage for the fruit grower. H. L. Jaquier, in an article entitled "The Fruit Tree Episode", recounts the making of a small fruit garden and S. A. Jesse describes the growing of grapes in his small greenhouse. In addition to other articles of interest there are full accounts of Fruit Group discussions, the exhibit at the fruit show demonstrating the classification of apples, etc.

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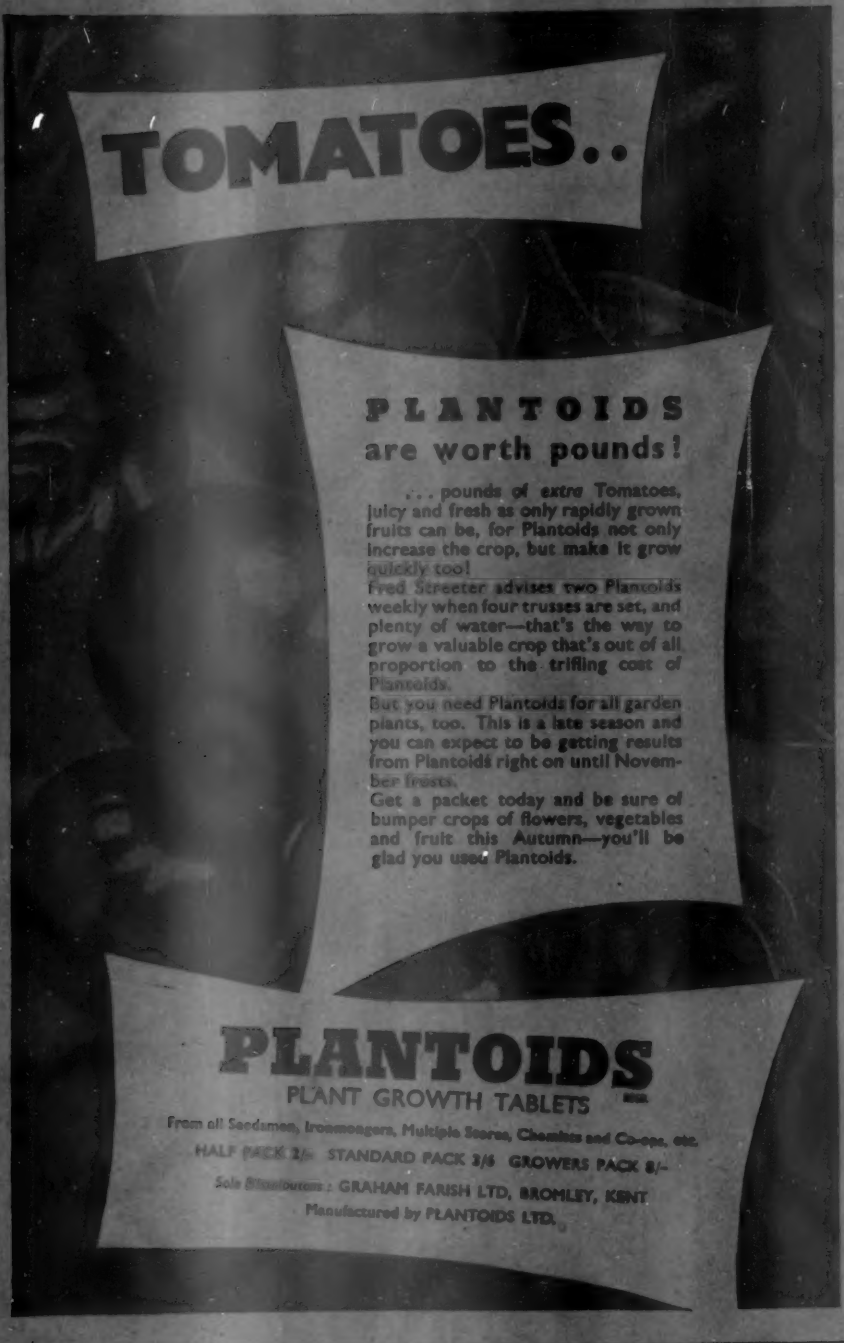
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